FOR OFFICIAL USE ONLY

Vol. 16. No. 8. pp. 253-288
Abstracts 1476-1688

August, 1946

IMPERIAL MYCOLOGICAL INSTITUTE
7 OCT 1946

THE VETERINARY BULLETIN

1946

The delay in publication is regretted. It is due to the damage sustained by the printers through enemy action. It is hoped that normal dates of publication will soon be resumed.

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WEYBRIDGE, SURREY
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Price 5/- net

Annual Subscription £2

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ERRATA

V. B. **16.** no. 7. p. 218, abst. 1253. First para., fifth line, for "two of which *were* infected with trichomoniasis artificially", read "two of which *had been* infected", etc. Last three lines of abst., for "and thereafter *for* several days preceding the anticipated return, etc., read ", and thereafter several days preceding the anticipated return", etc.

p. 223, abst. 1289, 2nd para. For "JUNGEBLUT & SANDERS [*V. B.* **13.** 124] and ANDREWS [*V. B.* **15.** 295]", read "JUNGEBLUT & SANDERS [*V. B.* **15.** 295] and ANDREWS [*V. B.* **13.** 124]".

REVIEW ARTICLES

(1) "**The Present Position of Phenothiazine as an Anthelmintic**".
(2) "**Trichomoniasis—A Review of Recent Literature**",

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IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 16.] August, 1946. [No. 8.

DISEASES CAUSED BY BACTERIA AND FUNGI

RICHOU, R., & HOLSTEIN, G. (1944.) L'anatoxithérapie staphylococcique en médecine vétérinaire. Résultats obtenus chez le cheval dans le traitement de certaines suppurations et en particulier de la furonculose cutanée. **[Staphylococcal anatoxitherapy in veterinary medicine.]**—*Bull. Acad. vét. Fr.* **17.** 60–64. **1476**

The authors describe field cases of staphylococcal infection in horses which were satisfactorily treated with staphylococcus toxoid. Cases of staphylococcal furunculosis sometimes reached epidemic proportions, but after the injection of 3–4 doses of toxoid the condition improved. The reappearance of the disease a year after treatment in one stud was stopped by single injections. A large measure of success was achieved in infections of the soft tissues, commonly ascribed to staphylococci, such as "botryomycosis" of the spermatic cord following castration, lymphangitis, chronic abscesses, mastitis, sinusitis and synovitis. Much less success attended the treatment of osteomyelitis. The authors admit that the failures among the cases treated may not have been staphylococcal infections, or may have been mixed infections. The greatest success was attained in chronic infections.—R. M. LOOSMORE.

ABRAHAM, E. P. (1945.) **The effect of mycophenolic acid on the growth of *Staphylococcus aureus* in heart broth.**—*Biochem. J.* **39.** 398–408. **1477**

The presence of mycophenolic acid in heart broth inoculated with *Staph. aureus* lengthened the lag phase of growth, particularly if a small inoculum was used. This increase in lag could be neutralized by the addition of filtrates from young growing cultures of the organism. The staphylococci rapidly became adapted to the presence of mycophenolic acid. A number of morphological changes (including clumping) occurred in cultures grown in the presence of the antibiotic for long periods.—E. BOYLAND.

ROSENOW, E. C. (1944.) **Studies on the virus nature of an infectious agent obtained from four strains of "neurotropic" alpha streptococci.**—*J. nerv. ment. Dis.* **100.** 229–262. [Abst. in *Bull. Hyg., Lond.* **20.** 159–160, copied *verbatim*. Signed: D. J. BAUER.] **1478**

Two strains of streptococci isolated from the anterior horn of the spinal cord of monkeys infected with poliomyelitis, and two strains from non-poliomyelitic sources, were taken through a number of passages in a special medium made from chick embryo tissue. This did not contain living cells, and growth of streptococci took place in it without the formation of acid. Filtrates of the cultures were inoculated intranasally into mice. After 3–21 days hyperirritability and tremors appeared, followed by death in 74 per cent. of animals; this result was obtained from all four strains of streptococci. Streptococci could be isolated from the brains, although the frequency of isolation declined in the higher passages. Mice inoculated with control material showed no such symptoms. The infectious agent could be transmitted to monkeys, rabbits and guineapigs. Minute pleomorphic diplococci could be found in filtrates of the cultures of streptococci and in spinal cord filtrates from infected monkeys.

When first isolated in mice the infectious agent produced symptoms of encephalitis, but after continued passage in monkeys poliomyelitic symptoms developed (flaccid paralysis). A change in antigenicity of the infective agent occurred at the same time. Monkeys which had recovered from the disease caused by the infectious agent were immune to reinoculation and also to inoculation with human poliomyelitis virus. The brains of all animals showed haemorrhages, degeneration of ganglion cells, neuronophagia and perivascular cuffing. The author suggests that streptococci and filterable agent are two forms of the same organism.

STEWART, D. F. (1943.) *Streptococcus agalactiae* **and its association with bovine mastitis in New South Wales.** pp. 62. New South Wales Department of Agriculture, Division of Animal Industry. **1479**

Strains isolated in New South Wales were biochemically typical of this species and group precipitin tests placed them in Lancefield's group B (group 1, Stableforth). Five serological types were distinguished, of which one was identical with a type found in the U.S.A.; three were closely related to but not identical with type srecognized in Great Britain and one was distinct from any other described type. Of 526 stable strains of *Str. agalactiae* only 1·14% failed to agglutinate with the type sera but reacted in the group precipitin test. The slide agglutination technique proved valuable in this work. All the serological types found were associated with pathological changes in the udder and no characteristic of *Str. agalactiae* could be correlated with potential pathogenicity or with persistence of infection. No more than two main serological types were found in any one of the herds studied. Infections encountered comprised persistent infections with clinical manifestations, mildly chronic infections without clinical symptoms and transient infections without clinical symptoms. Of 38 first-calf heifers 12 were infected, though none had been in direct contact with the milking herd. In some of these infection persisted and clinical symptoms occurred. The types isolated were the same as from the milking herd. Some cows were believed to be more resistant than others, but this was not associated with enhanced phagocytic powers. Infusion of the udder with entozon eradicated *Str. agalactiae* from 70% of 40 infected cows after three

treatments or less, irrespective of the serological type involved. Acriflavine was as effective as entozon but more irritant. Proflavine was not used because *in vitro* tests showed it to have a much lower bactericidal effect on *Str. agalactiae* than acriflavine or entozon.—D. A. G.

GUNDERSON, N. O., & ANDERSON, C. W. (1945.) **Can a differential germ test with a leucocyte count be used in the control of mastitis?**—*J. Milk Technol.* **8.** 147–152. **1480**

The answer given to this question is affirmative, provided that the test be properly carried out and interpreted by trained personnel. The authors recognize that the leucocyte count varies within wide limits even in milk from healthy cows. The "differential germ test" appears to be the recognition of *Streptococcus agalactiae* and the differentiation between this organism, "saprophytic streptococci" and other bacteria.

Bovine mastitis is stated to be divisible into contagious mastitis caused by *Str. agalactiae* and non-contagious mastitis due to "other streptococci", staphylococci and coliform organisms. [Mention is not made of the role played by *Str. dysgalactiae*, *Str. pyogenes* Group C, or *Corynebacterium pyogenes* (summer mastitis).]

The authors state that mastitis due to *Str. agalactiae* can be controlled and eliminated "by the use of suitable diagnostic tests and herd management"; these tests are listed as (1) the incubation of properly collected composite milk samples (with brom-cresol purple) from individual cows, (2) the Hotis test, (3) microscopic examination of stained slides for the presence of streptococci, together with a leucocyte count, (4) the growth of organisms upon a modified Edward's medium, and (5) the use of arginine broth and specific sera as additional tests for the differentiation of *Str. agalactiae* from other streptococci. Some hygienic precautions against the spread of infection within the cow byre and details of herd management are listed.—J. C. BUXTON.

FIELD, H. I., & SMITH, H. W. (1944.) **The examination of milk samples for mastitis. The comparative value of deep blood plating and incubated smears in diagnosis.**—*Vet. Rec.* **56.** 425–426. **1481**

This is an extension of the work of ROWLANDS & FIELD [see *V. B.* **16.** 131]. In a comparison of the diagnostic value of incubated smears as compared with deep blood plating, involving 1,080 routine milk samples (mostly quarter samples) 24·1% were positive for *Str. agalactiae*, 89·4% of them were positive to the smear and 85% to the culture method. It is suggested that practitioners might use the incubated smear method for the control of mastitis.

HALLINAN, F. J. (1943.) **A bromthymol blue field test for bovine mastitis.**—*Ann. Rep. N. Y. St. Ass. Milk Sanit., 1943.* pp. 121–124. **1482**

An attempt was made to standardize the bromthymol blue test by using colour standards at known pH. Munsell colour papers, available for the pH range 6·0–8·0 at intervals of 0·5, were used (the Munsell system was adopted as the American War Standard for the specification and description of colour) in glass tubes of the same size as those used in the test, the tubes being packed with cotton wool to keep the paper in position against the glass. When not in use, they were stored in the dark to prevent fading. The necessity for closer graduation at pH 6·9–7·0 is emphasized. The technique of the test is outlined.—R. M. LOOSMORE.

VALENTE, J. S. (1944.) A botriomicose. [**Botryomycosis; its definition, aetiology, and diagnosis, infection and pathogenesis.**]—*Rev. Med. vet., Lisboa.* **39.** 283–294. **1483**

V. reviews botryomycosis, giving its definition, aetiology, microscopic and experimental diagnosis, pathogenesis in both man and animals and treatment. A comprehensive bibliography is given.—H. G. A.

STERNE, M. (1945.) **A note on the efficacy of commercial anti-anthrax bacterins.**—*J. S. Afr. vet. med. Ass.* **16.** 82–83. **1484**

At the Onderstepoort laboratory no satisfactory immunity was obtained with vaccines made from killed cultures. Four commercial bacterins from reputable American firms were compared with the Onderstepoort avirulent spore vaccine, g. pigs receiving the dose recommended for sheep, a second dose of the bacterins being given two weeks later. The immunity was tested three weeks later with 100 M.L.D. of Pasteur II strain.

Twenty g. pigs were used with each vaccine. All the animals receiving Onderstepoort vaccine survived. Of those receiving the four bacterins, two survived with one, one with two others and none with the fourth, indicating that these bacterins possessed weak immunizing powers.—E. M. ROBINSON.

CHIAMA, D. (1943.) Proyecto de profilaxia y erradicacion tuberculosa. [**A scheme for the prophylaxis and eradication of tuberculosis.**]—*1er Congr. Méd. vet. Prov. B. Aires, 1943.* pp. 237–243. **1485**

C. proposes a 1% levy on all transactions in cattle, sheep and pigs to finance a campaign against TB.; the campaign would begin with the tuberculin testing of livestock. The incidence of bovine TB. in the different European countries is reviewed.—H. G. ARAMBURU.

CASTAGNET, A. D., & POZZI, C. M. (1943.) Profilaxis de la tuberculosis bovina. [**The prevention of bovine TB.**]—*1er Congr. Méd. vet. Prov. B. Aires, 1943.* pp. 147–157. **1486**

The authors discuss measures suitable for use in a campaign against bovine TB. in the Argentine and suggest legislation to deal with the slaughter of clinically affected animals and the widespread tuberculin-testing of cattle. No compensation should be paid for the slaughter of clinically diagnosed animals and the amount payable on slaughter of reactors to the test should be based on the degree of infection. In certain circumstances the ovariotomy of reacting cows should be allowed as an alternative to immediate slaughter.

Vaccination with BCG is advocated as a general measure.—H. G. ARAMBURU.

SELTER, H. (1943.) Tuberkulinempfindlichkeit, Tuberkuloseimmunität und Tuberkuloseschutzimpfung in ihrer Bedeutung für die Tuberkuloseabwehr. [**Tuberculin sensitivity, tuberculous immunity and preventive inoculation in their significance for the elimination of TB.**]—*Dtsch. med. Wschr.* **69.** 739–742. [Part of abst. in *Bull. Hyg., Lond.* **19.** 479–480, copied *verbatim*. Signed: W. H. TYTLER.] **1487**

This well-known author re-states and summarizes most of the views which he has previously expressed in numerous papers, during 35 years of experimental study of hypersensitivity and immunity in tuberculosis. Some of these views will continue to meet with opposition, as in the past, but they have the interest of personal opinions based on direct observation by an investigator of individuality and long experience. They may be tabulated as follows:–

(1) Tuberculin allergy results from the solution of tubercle bacilli in the lymph nodes related to the site of infection, and the distribution of soluble products in the circulation, which stimulate an increased capacity for inflammation in the body tissues generally.

(2) Koch's Old Tuberculin, prepared by heat concentration of fluid media from tubercle bacillus cultures, contains both the true "tuberculin substance" and also

the protein materials of the bacillary bodies, and of the bouillon.

(3) "Tuberculin substance" is colloidally dispersed, and can resist heating to 150°C. It is not an antigen, and it acts only as an irritant or catalyst, causing inflammation in sensitized tissues, but not itself being bound or altered.

(4) The reaction to Old Tuberculin is double—a true tuberculin reaction, and an anaphylactic reaction, resulting from the combination of bacillary protein with corresponding antibodies.

(5) The tuberculin reaction is not strongly specific, and in tuberculous subjects reactions can be elicited by non-specific bacterial substances such as extracts of *Bact. coli*, which are indistinguishable histologically from those caused by tuberculin.

(6) The possibility of complete healing in the anatomical and biological senses is not excluded. LJUNG, in Upsala, among 543 positive rectors, aged 7 to 15, found 37 who later gave negative reactions to 1·0 mgm. O.T. intradermally.

(7) The guineapig is the most suitable experimental animal for the study of immunity in tuberculosis, and should be used for the testing of all preparations destined for preventive immunization. Although much more sensitive to tubercle infection than the rabbit, it can develop an immunity which will resist virulent infection in doses many times those fatal to normal controls.

(8) Using a low virulent strain [Strain E.M.] of human tubercle bacillus, SELTER and his colleagues have succeeded in producing "complete immunity" in the guineapig, though naturally only in a proportion of those treated. Of 383 treated animals, 181 resisted virulent reinfection for at least three months, at which times all controls showed generalized disease.

(9) The mechanism of immunity in tuberculosis does not depend on antibodies, or on phagocytic cells. Virulent bacilli in the immune animal are distributed to the regional lymph nodes and internal viscera, and remain there for months, without multiplying, but without losing their virulence. Only very slowly do they die and disappear. The explanation is not clear, but the author envisages physico-chemical changes by which the immune cells become insusceptible to the toxic effect of the bacilli.

(10) Man is almost as susceptible as the guineapig to primary infection, since apparently very small numbers of bacilli suffice to infect; but on the other hand, only a very small proportion of infected humans actually develop clinical disease.

(11) Allergy and immunity are distinct and separate processes, as clearly shown by the desensitization experiments of RICH and his colleagues. SELTER and WEILAND have confirmed these results and find desensitization favourable to immunity rather than the reverse. Of guineapigs immunized with strain E.M., and reinfected with virulent bacilli, 26 per cent. of those not desensitized, 50 per cent. of those desensitized from the day of re-infection, and 63 per cent. of those desensitized from the day of first infection, were found to be immune.

(12) Selter has never succeeded in producing immunity by injection of dead bacilli. Injection of dead bacilli in lanolin or vaseline, as used by SAENZ, increased the duration of life after virulent infection, but in no case gave complete protection.

I. *MADSEN, T., HOLM, J., & JENSEN, K. A. (1942.) **Studies on the epidemiology of tuberculosis in Denmark.** pp. 176. Copenhagen: Ejnar Munksgaard. [In English.] [Abst. from review in *Maanedsskr. Dyrlaeger*. **55.** 74.] **1488**

II. *SPRINGBORG, A. (1943.) Om 5 Aars Tuberkulosestationsarbejde i et Landdistrikt. **[Five years' work at a country TB. clinic.]**—*Nord. hyg. Tidskr.* **24.** 83. [Abst. from abst. in *Maanedsskr. Dyrlaeger.* **55.** 184.] **1489**

I. The review is an account of the type of information presented in the book, including much information on human and bovine TB. in Denmark.

II. During the period 1936–40, type determination in 229 cases of human TB. resulted in the finding of 26 (11%) of the bovine type, 16 being in adults and ten in children. In one of these cases infection evidently passed direct from one human being to another; the remainder originated from infected cattle. The district involved in this work was Aalborg, Denmark.—J. E.

*VACCAREZZA, R. F., & ARENA, A. R. (1943.) Tuberculosis de origen bovino. **[TB. of bovine origin in Argentina.]**—*Rev. Asoc. méd. argent.* **57.** No. 501–504. 10–22. [Abst. in *Biol. Abstr.* Sect. F. **18.** No. 2. 11, copied *verbatim.*] **1490**

Bovine tuberculosis is discussed in a review covering incidence of this disease in man, its pathogenesis, distr. in Argentina, bacteriologic diagnosis, infection in Argentine cattle and their milk and derivatives, and prophylaxis, including tuberculin tests.

KOKURICHEV, P. I. (1940.) Izmeneniya, vyzyvaemye vaktsinoĭ BCG u krupnovo rogatovo skota, i ikh znachenie dlya protivotuberkuleznovo immuniteta. **[The lesions produced by BCG vaccine in bovines and their importance in immunity to TB.]**—*Rabot. XIII Plen. vet. Sekt. Akad. sel'khoz. Nauk, Moscow, 1939.* [*Collected Works.*] pp. 129–133. **1491**

Of 556 calves vaccinated with BCG and exposed to natural infection with TB., 164 were later examined P.M. Of these, 132 were examined histologically and in 30 changes were found attributable to BCG, in 10 mixed lesions provoked by BCG and by virulent tubercle bacilli, and in 69 lesions attributable entirely to the virulent bacilli and showing no trace of the effect of BCG. It is concluded that although a certain degree of immunity is conferred on calves by BCG vaccination, this is not adequate for the protection of animals mixing with infected stock.—L. LEVENBOOK.

HANSEN, O. G. (1944.) **B.C.G. vaccination in Norway.**—*Tubercle, Lond.* **25.** 1–6. **1492**

BCG vaccination of nurses and medical students is known to reduce markedly the morbidity from TB. The immunity obtained is generally associated with the allergy. For example, the morbidity in a group of nurses was found to be 2·6% each year in a vaccinated group, compared with 17·1% each year in a tuberculin-negative, non-vaccinated group. However, if those nurses who did not become tuberculin-positive as a result of vaccination were considered separately, the morbidity rate was 10·8% each year, as compared with 0·9% each year in the group in which vaccination stimulated a reaction to tuberculin. If no allergy results from vaccination, re-inoculation should therefore be carried out until the subject reacts.

The immunity obtained by vaccination is not absolute, but may be broken down occasionally by super-infection with virulent human tubercle bacilli. The duration of the immunity and allergy is not known, but it is probable that the allergy stimulated by vaccination lasts about four years or more.

BCG vaccination is on the increase in Norway, and in 1942, 6,000 vaccinations were carried out, usually on individuals known to be exposed to infection and on tuberculin-negative individuals in those age-groups in which primary infection is most common. Unvaccinated tuberculin-positive individuals are known to have a useful immunity against tuberculous infection, in addition to their allergy.

Complications of vaccination include abscess and sinus formation, but so far there is nothing to indicate that BCG vaccination of infected individuals reactivates latent tuberculous foci. H. considers that the von Pirquet test is rendered more sensitive by the addition of adrenalin to the tuberculin (one drop of 1% solution of adrenalin to 1 ml. of tuberculin).

Plans for mass investigation of TB. in Norway (frustrated by the German invasion) included mass radiography, tuberculin testing and BCG vaccination of the tuberculin negative. In any eradication campaign the preparation of the vaccine must be adequately controlled, since the virulence of the organisms may vary and influence the results. With a vaccine of low potency there will be failures, yet a too potent vaccine will cause the formation of abscesses or sinuses which may take months to heal.—I. W. BROCKLEHURST.

LO RUSSO, R. (1945.) Comparación de las fórmulas leucocitarias de la leche de vacas que reaccionan o no a la tuberculina. Su importancia en la inspeccion sanitaria de la leche. **[The leucocytic formula of milk from cows reacting to tuberculin.]**—*Rev. Med. vet., B. Aires.* **27.** 89–127. **1493**

This is a general review of the leucocytic picture of the milk in reactors to the tuberculin test. The leucocyte count of 14 tuberculin-negative cows showed no discrepancy from that established by BOURGEOIS: six tuberculin-positive cows showed an increase in leucocyte count of an average of 38% of lymphocytes, a decrease of 1% in monocytes, of 26% in neutrophiles and of 1% in eosinophiles.—H. G. ARAMBURU.

MAYER, R. L. (1944.) **A yellow pigment formed from p-aminobenzoic acid by *Mycobacterium tuberculosis* var. *hominis*.**—*J. Bact.* **48.** 337–345. [Author's conclusion copied *verbatim*.] **1494**

(1) The strain No. 607 of *Mycobacterium tuberculosis* var. *hominis* forms a bright yellow pigment when grown in the presence of p-aminobenzoic acid.

(2) The same coloration is observed in the presence of procaine. Other derivatives of Paba give no pigment, probably because their high bacteriostatic activity prevented the use of suitable concentrations.

(3) The pigment is formed from Paba by an enzyme which seems to be a specific oxidase.

(4) Fe, Mg, glucose, ascorbic acid, the pH, NaCN and the age of the culture have a definite influence on the activity of this enzyme.

(5) The yellow pigment contains oxidized NH_2 groups. Its chemical properties seem to show that it is, or contains, an unstable oxidation product of Paba.

SOLOMKIN, P. S., & ROZANOV, N. I. (1944.) O prizhiznennoĭserodiagnostike batsillyarnoĭrozhi svineĭ. **[Rapid plate agglutination test for swine erysipelas.]**—*Veterinariya, Moscow.* No. 1. pp. 24–25. **1495**

The authors describe the preparation of an antigen from *Erysipelothrix rhusiopathiae*. The organisms were grown in broth (pH 7·3–7·5) for 24 hours at 37°C. and were then transferred to liver agar of the same pH. After incubation for 48 hours the culture was washed off with 0·3% formalin-saline. The suspension was filtered and centrifuged and brought up to the density of a paratyphoid standard (5,000 million bacteria) with 0·3% formalin. The antigen was then examined microscopically for its specificity and agglutinability. When it was used in the field for detection of carriers and chronic cases, two out of 186 pigs reacted, *E. rhusiopathiae* being isolated from a joint of one of the two. In another herd of 147 breeding and 67 fat pigs nine reacted. Three of the reactors were slaughtered and the organism was isolated from the spleen of one and an elbow joint of another.

The rapid (slide) test is recommended for use in the field.—A. CARTER.

KLAUDER, J. V. (1944.) **Erysipelothrix rhusiopathiae infection in swine and in human beings. Comparative study of the cutaneous lesions.**—*Arch. Derm., Chicago.* **50.** 151–159. [Abst. in *Bull. Hyg., Lond.* **20.** 258, copied *verbatim*. Signed: R. LOVELL.) **1496**

A comparison is made of the cutaneous lesions caused by *Erysipelothrix rhusiopathiae* in swine and in human beings. The infection in pigs is manifested in three forms; a severe or septicaemic form characterized by constitutional disturbances with diffuse areas of erythema and at times vesicles, petechiae and necrosis; a mild form with mild constitutional disturbances and sharply circumscribed quadrangular lesions on the skin (the diamond skin disease); and a chronic form with polyarthritis and, at times, vegetative type of endocarditis. The cutaneous lesions may be related to a local immunity reaction and bear some relationship to the rôle the skin plays in the defensive mechanism.

There are three forms of disease in man :– the first is a mild rather localized cutaneous infection caused by a trivial injury and may be accompanied by mild arthritic symptoms, usually involving the fingers. The second form is a diffuse or generalized cutaneous eruption with arthritic and constitutional symptoms, and blood culture is negative. This type compares with the mild form of infection in pigs and the eruption becomes diffuse and appears at areas remote from the site of inoculation; recovery ensued in all cases reviewed by the author although the duration of illness was, in some patients, months. The third form is a septicaemic form with endocarditis, positive blood culture, with or without cutaneous lesions. The eruption, when present, is purpuric in type with the following distinctive features: formation of plaques, purpuric linear lesions on the creases of the palms and fingers, and haematoma-like swellings of the ears. The eruption in man does not compare with the diffuse, large, ill-defined patches of erythema that occur in the septicaemic form of infection in pigs but rather with the petechial lesions. The involvement of the ears in man is apparently of diagnostic importance and a similar lesion has been described in pigs; a haematoma-like swelling may also appear on the caruncle of infected turkeys.

In the one septicaemic case in a human being in which immune serum is recorded as being used there was rapid improvement. [Treatment of pigs and man with immune serum is a well-recognized therapeutic procedure.]

PADMANABHAN, C. V. (1945.) **Creating a malady simulating haemorrhagic septicaemia by malicious method.**—*Indian vet. J.* **21.** 430–431. **1497**

P. describes criminal poisoning of cattle as practised in Madras. This consists of inserting into the animal's mouth and thrusting near its throat a curved wooden stick into which a chisel smeared with the juice of the madar plant (*Calatropis gigantica*) is inserted. After 24 hours the animal has symptoms highly suggestive of haemorrhagic septicaemia and death follows.

—M. M. HUQ.

BROWN, J. H. (1944.) **The susceptibility of fur-bearing animals and game birds to tularaemia.**—*Canad. Field. Nat.* **58.** 55–60. [Abst. in *Exp. Sta. Rec.* **91.** 593, copied *verbatim*.] **1498**

The purpose of this paper is to record the known facts in regard to the relationship of tularaemia to fur-bearing animals and game birds, and to point out the situation as it now exists in Alberta.

TRUFANT, S. A. (1943.) **Sylvatic plague; probable origin in United States, distribution, potentialities as reservoir for infections in man.**—*New Orleans med. surg. J.* **96.** 184. **1499**

Plague is known to exist in wild rodents in 12 of the western states of the U.S.A. Localized epizootics among wild rodents usually occur in early spring and continue with a cyclic mortality for periods of over three years. So far, spontaneous infections or reservoirs of plague have been established in over 31 rodents, including ground squirrels, marmots, chipmunks, woodrats, kangaroo rats, prairie dogs and rabbits. The plague bacilli responsible for these epizootics are biologically identical with those causing plague in rats and man in many parts of the world. It is now well established that sylvatic plague can be transmitted from these wild rodents to man, although the actual danger to man has not yet been fully established.—D. D. O.

STEFFENS, M. (1944.) Beitrag zur Enteritis-Breslau-Infektion bei Mensch und Tier. [*Salmonella typhimurium* **in human beings and animals.**]—*Berl. Münch. tierärztl. Wschr.*[*Wien. tierärztl. Mschr.* June 9th. 185–187. **1500**

An outbreak of disease at an orphanage caused by *S. typhi-murium* was traced to eggs from a farm where some ducks had died recently. Examination of droppings from other ducks and monthly examinations of a stagnant pool from July to December also revealed the organism. Water from the overflow of the sedimentation tank which drained into the pond, the droppings of pigs, ducks, fowls and the faeces and milk of cows were either occasionally positive, or negative. No permanent carriers were found amongst the stock. S. concludes that the pond was responsible for the infection and suggests that rats may have helped to perpetuate the presence of the organism.—R. A. ROPER.

MCNEIL, E., & HINSHAW, W. R. (1944.) **Snakes, cats and flies as carriers of** *Salmonella typhimurium.* —*Poult. Sci.* **23.** 456–457. **1501**

Investigations were carried out on the epidemiology of *S. typhi-murium* infection in turkey poults, in order to determine the source of outbreaks which could not be traced to turkey carriers. A gopher snake, a garter snake, two cats and house flies, all caught on infected turkey ranches, were found to harbour *S. typhi-murium.* Other species examined were two quail, a crow and a king snake [*Lampropeltis getulus*]. These failed to show evidence of infection.—I. W. BROCKLEHURST.

GORDON, R. F., & BUXTON, A. (1945.) **The isolation of** *Salmonella thompson* **from outbreaks of disease in chicks.**—*J. Hyg., Camb.* **44.** 179–183. **1502**

S. thompson, which is said to be the second commonest cause of salmonella food poisoning in Great Britain, was isolated from 31 outbreaks of salmonellosis in chicks and two outbreaks in ducklings. The mortality in chicks ranged from 20%–80% and in some cases was even 100%. Losses usually occurred in chicks 4–12 days old, with a peak incidence at nine days. The symptoms of infection were inconclusive, and resembled those of *S. pullorum* infection. There were no characteristic lesions, although congestion of the lungs was common and there was sometimes congestion of the liver and retention of the yolk sac.

Infection may be transmitted through the medium of carriers in the breeding flock, which disseminate infection either directly through the ovum or by faecal contamination of the egg shells, or it may be transmitted mechanically by attendants or vermin. *S. thompson* was isolated by the authors from the intestinal tract of two adult fowls, from the outside of the shell of a goose egg in an infected hatchery, from incubator débris and from two mice on one farm. There was little evidence to confirm direct egg transmission from the infected ovum, as in pullorum disease.

Attempts to control spread of infection by the agglutination test have not been carried out sufficiently to justify a conclusive report; the work is to be continued.—I. W. BROCKLEHURST.

LIVE, I., STUBBS, E. L., & MACKEY, W. L. (1944.) **The influence of intracutaneous injection of sonic filtrate of** *Brucella abortus* **on the blood-leucocyte picture of cattle positive to brucellosis.**—*J. infect. Dis.* **75.** 170–174. **1503**

Changes in the leucocyte picture of the blood have been described for both human and bovine TB. The authors made a study of these changes in bovines injected intradermally with a *Br. abortus* sonic filtrate [see *V. B.* **13.** 121]. Nine infected and six negatively reacting cows were used. Within 6–8 hours of injection marked changes were observed, the most significant being a rise in the percentage of immature one-lobed neutrophiles, with a considerable increase in the total counts and the percentage of mature neutrophiles. The various cell components returned to approximately pre-injection levels at the end of 48 hours. Cows negative to brucellosis which were subjected to the same treatment showed only slight variation which was probably normal. It is suggested that the data obtained may present a basis for an additional test for brucellosis.—S. J. GILBERT.

LIVE, I., SPERLING, F. G., & STUBBS, E. L. (1945. **Studies on the immunization of guinea pigs against brucella infection.**—*J. infect. Dis.* **77.** 16–24. **1504**

Sonic extract was prepared by centrifuging sonically killed bacteria to remove most of the intact cells and adding ethyl ether to the supernatant fluid. When injected either subcutaneously or intracutaneously into g. pigs the extract produced an active immunity against moderate infecting doses of virulent *Brucella abortus.* Of 18 g. pigs thus immunized two became infected while only one control animal was proved negative by culture. Vaccination experiments were also carried out on g. pigs using brucella organisms killed with ethyl ether. Subcutaneous injections of a total of 75–300 thousand million organisms produced an active immunity in g. pigs against moderate infecting doses of virulent *Br. abortus.* In two such experiments, of 21 treated g. pigs only four proved to be infected while 20 controls were found positive by culture. If the infecting dose was increased less protection was afforded to the vaccinated animals. Intracutaneous inoculation of one-tenth the number of ether-killed *Br. abortus* proved more effective in protecting g. pigs against brucella infection than subcutaneous injection. Injection of sonic extract or ether-killed whole cells produced either low agglutinin titres or no demonstrable agglutinins in g. pigs, and the animals which had acquired an immunity after vaccination did not develop agglutinins as a result of injection of the infecting dose.

—S. J. GILBERT.

SOFIA, F. (1944.) La brucellosi umana in Eritrea. Studio batteriologico. [**Human brucellosis in Eritrea; bacteriological study.**]—*Boll. Soc. ital. Med Ig. trop.* (*Sez. Eritrea*), *Asmara.* **4.** No. 1. 229–236. [English summary.] [Abst. in *Bull. Hyg., Lond.* **20.** 194, copied *verbatim.*] **1505**

The author has studied 20 strains of Brucella, identified as the *melitensis* variety. This particularly agrees with what Cilli demonstrated from some samples of cheese of local production.

SPADARO, O. (1944.) Indagini sull'infezione brucellare tra alcuni gruppi di pastori del Bassopiano Orientale Eritreo. **[Investigations on brucellosis in Eritrean shepherds.]**—*Boll. Soc. ital. Med. Ig. trop.* (*Sez. Eritrea*), *Asmara.* **4.** No. 1. 189–201. [English summary.] [Abst. in *Bull. Hyg., Lond.* **20.** 194, copied *verbatim.*] **1506**

"The author, doing the Burnet skin reaction and Wright serum-agglutination, on several groups of the B.O.E. shepherds, found that a large percentage of them is sensitive to the Brucellae".

DICKINSON, L. (1945.) **The influence of substrate on the variation of** *Br. bronchiseptica.*—*J. Path. Bact.* **57.** 285–294. **1507**

Subculturing on Koser's medium produced a stable variant which produced much less toxin than the normal strain. The relation between substrate and variation was examined. The differences between the normal and variant forms were also studied, considerable differences being found in toxicity, pathogenicity, etc. For routine detection of the variant strain, growth was produced on medium to which not less than 25% blood had been added, the V strain producing much less haemolysin than the N or normal strain. Variation appeared to depend on metabolic processes affected by NaCl concentration and the stereo-chemical structure of the energy source. Irradiation with X-rays stimulated variant production.—S. J. GILBERT.

FOSS, J. O., & NELSON, C. I. (1945.) **A case of mastitis due to Clostridium perfringens.**—*N. Amer. Vet.* **26.** 604–605. **1508**

A case is described of acute gangrenous mastitis with diffuse subcutaneous swelling and sloughing of the infected quarter. The only organism recovered from the quarter and the subcutaneous fluid was *Cl. welchii.* Although there seems little doubt that this was the cause of the condition, the method of identification of the organism is not conclusive and it was of low pathogenicity for g. pigs and rabbits. Treatment was given in the form of large doses of sulphanilamide and the cow eventually recovered.—R. M. LOOSMORE.

ZELEVINSKAYA, S. A., VOLKOVA, Z. M., & KONSTANTINOVA, V. I. (1944.) Aktivnaya immunizatsiya protiv gazovoĭ gangreny (B. perfringens). **[Active immunization against gas gangrene** (*Clostridium welchii*).**]**—*Zh. Mikrobiol., Moscow.* No. 9. pp. 10–15. [Abst. in *Bull. Hyg., Lond.* **20.** 363, copied *verbatim.* Signed: D. J. BAUER.] **1509**

Rabbits were immunized with the formalin-inactivated toxin of *Cl. perfringens* [*Cl. welchii*]; the best results were obtained with three injections of 1, 2, and 2 cc. at intervals of 20 days. The level of circulating antitoxin was still rising 35 days after the last injection (up to 5 units in one case). The protective effect of the rabbit immune sera was tried in guineapigs; the sera were given intraperitoneally, followed 24 hours later by an intramuscular injection of living culture. Of 15 animals given sera of varying potencies, 11 were protected. Rabbits were immune to the intramuscular injection of 1 cc. of living culture if the blood antitoxin level was greater than 1/30 unit per cc.

Toxoid concentrated by desiccation had increased antigenic properties but the crude product caused reactions, owing to concentration of the proteins of the nutrient medium.

Eight human volunteers were inoculated with toxoid (1–2–2 cc. at 20-day intervals). The blood antitoxin level rose to 1/10 unit; no general reactions were observed.

KOMKOVA, O. A. (1944.) Aktivnaya immunizatsiya protiv B. perfringens. **[Active immunization against** *Clostridium welchii.*]—*Zh. Mikrobiol., Moscow.* No. 9. pp. 18–20. [Abst. in *Bull. Hyg., Lond.* **20.** 363, copied *verbatim.* Signed: D. J. BAUER.] **1510**

Rabbits were immunized with the formalinized toxin of *Cl. perfringens* [*Cl. welchii*], and also with toxin precipitated with alum and with trichloracetic acid. One and two cc. were given with an interval of one month. The antibody titres 15 days after the last injection were 0·05–0·75 unit (formol toxoid), 0·5–0·75 unit (alum-precipitated toxin) and 0·25–1·0 unit (toxin precipitated with trichloracetic acid). After 70 days the titre was much lower in all cases (0·5 unit or less). One year later the rabbits were revaccinated; the titre two weeks later rose to 1–2 units, but fell after one month to 0·2–0·02. Four rabbits were injected with 1 cc. of living culture seven months after revaccination, when less than 0·02 unit of antitoxin was present in the serum; all were immune.

ZELEVINSKAYA, S. A., & EBERT, M. K. (1944.) Aktivnaya immunizatsiya protiv gazovoĭ gangreny (B. oedematiens). **[Active immunization against gas gangrene** (*Clostridium oedematiens*).**]**—*Zh. Mikrobiol., Moscow.* No. 9. pp. 16–17. [Abst. in *Bull. Hyg., Lond.* **20.** 363, copied *verbatim.* Signed: D. J. BAUER.] **1511**

Three groups of guineapigs were immunized with *Cl. oedematiens* toxoid, 0·5, 1 and 1 cc. being given at 20-day intervals in the first group and at intervals of 10 days and 5 days in the second and third groups respectively. The animals were infected 15–30 days after the last injection by crushing the thigh muscles and injecting a living culture. Of 19 immunized animals, 18 were protected and showed no signs of disease over a 40-day period of observation. Non-immune controls died 24–72 hours after infection.

BELOV, M. P., & LASKIN, V. E. (1944.) K voprosu bystroĭ diagnostiki gazovoĭ gangreny. **[The rapid diagnosis of gas gangrene.]**—*Zh. Mikrobiol., Moscow.* No. 9. pp. 23–27. [Abst. in *Bull. Hyg., Lond.* **20.** 363, slightly amended. Signed: D. J. BAUER.] **1512**

Polysaccharides were extracted from *Cl. perfringens* [*Cl. welchii*], *Cl. oedematiens*, *Cl. septicum* and *Cl. histolyticum* which gave specific precipitin reactions with sera from rabbits immunized to these organisms. No cross-reactions occurred. The precipitin titres of the sera averaged 1 : 8, while the polysaccharides still gave positive reactions in a solution of 1 : 800,000. The polysaccharides could also be extracted from infected muscle by boiling with saline; a precipitin reaction performed with the extract afforded a rapid diagnostic test.

BOYD, J. S. K. (1946.) **Tetanus in the African and European theatres of war. 1939–1945.**—*Lancet.* **250.** 113–119. [Author's summary and conclusions copied *verbatim.*] **1513**

The incidence of tetanus in the African and European campaigns has been negligible. This is chiefly attributable to active immunisation with tetanus toxoid. Active immunisation did not prevent the development of tetanus in 22 cases. The case-mortality rate among the actively immunised did not fall below the average, but it is noteworthy that the majority of fatal cases were in coloured troops. The case-mortality rate in actively immunised men who were given prophylactic antitoxin was significantly lowered.

The duration of the symptoms in actively immunised men who survived was also significantly lowered. The incubation period in the actively immunised rarely exceeded ten days, whereas in most of those who were not actively immunised the incubation period was more

than ten days. Failure of active immunisation appears to be attributable to an inadequate level of circulating antitoxin in the early stages of infection and is more likely to be remedied by prophylactic antitoxin than by a "booster" dose of toxoid. Therapeutic antitoxin, to be effective, must be given as early as possible in large doses by the intravenous route. Sedatives, including avertin and pentothal, did not influence the course of the disease, although they were effective in relieving symptoms.

THOMAS, B. A., LENNOX, M., & DUNCAN, J. T. (1945.) **The role of animal-type dermatophytes in human ringworm.**—*Brit. med. J.* Sept. 15th. 346–349. **1514**

The authors discuss the role of animal type dermatophytes in human ringworm infection in Great Britain. Reference to the literature shows that animal sources of infection have been recognized from time to time in tinea circinata but less frequently in tinea tonsurans. An epidemic of ringworm is described in which five persons were directly affected and four indirectly affected from a puppy. Subsequently cultures were made from 45 unselected cases of skin disease and in 21 where positive cultures were obtained, five yielded organisms of human type. In many cases animal contact could be traced. The nature of the lesions in these cases in man is described and treatment is also discussed. In cases of tinea tonsurans caused by ringworm fungi of animal origin it is suggested that conservative treatment should be employed in preference to X-ray depilation.—T. E. GIBSON.

VERGE, J., DRIEUX, H., & QUARANTE, M. (1944.) La voie de pénétration d'*Actinomyces Israeli Bovis* agent de l'actinomycose des bovidés. **[The means of entry of *Actinomyces israeli bovis*, the agent of bovine actinomycosis.]**—*Bull. Acad. vét. Fr.* **17.** 41–43. **1515**

Infection of the pharynx with *Actinomyces israeli bovis* in a bovine is described. The animal showed increasing dysphagia, dyspnoea and loss of condition over seven months. Iodine therapy proved useless. On autopsy, the mucous membrane of the pharynx was found to be fibro-oedematous and covered with yellowish pinhead nodules, most numerous on the inferior wall, and extending to the anterior portion of the oesophagus.

Histologically, typical lesions of actinomycosis were found, with cystic salivary glands due to blocking of the canal. One of the lesions seen was confined to the Malpighian layer. The authors take this to indicate that infection was caused by mild trauma, and that infection was confined outside the basal layer. Deeper lesions are caused by lymphatic infection arising from more severe trauma, such as erupting teeth.—R. M. L.

TAYLOR, A. W. (1944.) **Actinobacillosis in sheep.**—*J. comp. Path.* **54.** 228–237. **1516**

The author concludes that *Bacterium purifaciens* and *Actinobacillus lignieresi* are culturally and biochemically identical and suggests that the name *Bact. purifaciens* be dropped. Infection of the sheep with this organism is characterized by chronic abscess formation in the tissues of the head and in the lungs. It appears to affect mainly rams but has been recorded in ewes and lambs. In three cases, the route of entry appeared to be wounds. The disease was reproduced in sheep by intravenous and subcutaneous inoculations of freshly isolated strains of the organism, but attempts to transmit it by skin scarification gave negative results. Treatment by three intravenous injections of 3 g. sodium iodide in 25 ml. distilled water at weekly intervals, or 5 g. potassium iodide in 30 ml. distilled water given *per os* daily for ten days resulted in complete cure. T. concludes that the organism may be a commensal of the mouth and skin of sheep in the United Kingdom, gaining access to the tissues and giving rise to progressive disease only in the presence of factors as yet unknown, of which physical injury is probably one.—G. B. S. HEATH.

HAGE, T. J. (1945.) **Saccharomycopsis guttulatus. I. Pathogenicity for young rabbits.**—*Amer. J. vet. Res.* **6.** 117–119. **1517**

A feeding experiment with spore and vegetative forms of *S. guttulatus* was carried out upon four young rabbits, the fifth being left as a control.

Saline suspensions of spores obtained from the faeces of a naturally infected host were fed to two of the rabbits under experiment, while the other two received vegetative forms of the fungus. Increasing numbers of spores of *S. guttulatus* appeared in the faeces of all four rabbits three days after inoculation and all showed symptoms of mucoid enteritis, from which two died and two recovered. P.M. findings included nephritis and enteritis with large numbers of spores of *S. guttulatus* in the intestinal contents. It is suggested that this fungus may be a contributory factor in the occurrence of mucoid enteritis of rabbits.—J. C. B.

LEVY, B., & BLACK-SCHAFFER, B. (1945.) **Studies in experimental systemic mycosis. I. Systemic chromomycosis (chromoblastomycosis) in mice: preliminary study.**—*Amer. J. trop. Med.* **25.** 117–127. **1518**

Chromomycosis is recognized as a skin disease of man usually caused by the fungus *Hormodendrum pedrosoi*. Attempts to transmit the infection to rabbits and monkeys failed, but in one out of five rats inoculated intraperitoneally *Hormodendrum* was demonstrated in microscopic nodular lesions of the liver. The successful infection of mice by intraperitoneal and intravenous inoculation is now recorded with the formation of visceral tubercles characterized by micro-abscesses, and the presence of spores and mycelium.—U. F. R.

LEONIAN, L. H., & LILLY, V. G. (1945.) **Conversion of desthiobiotin into biotin or biotin-like substances by some microorganisms.**—*J. Bact.* **49.** 291–297. **1519**

Twelve different species of yeasts were grown in a nutrient medium where desthiobiotin replaced biotin. Hydrolysates of the cells, after three days' incubation in such a medium, were tested for biotin activity by *Lactobacillus arabinosus*, *Lactobacillus casei*, *Rhizobium trifolii* 205, and *Sordaria fimicola*. All four of these organisms grew well in all hydrolysates, indicating conversion of desthiobiotin into biotin or biotin-like substances by all twelve yeasts. Four filamentous fungi, representing the genera *Neurospora* and *Ceratostomella* were also able to convert desthiobiotin to biotin-like substances which were utilized by *Lactobacillus casei* and *Sordaria fimicola*. The amount of biotin activity recovered depended upon the organism being assayed and the test organism used.

Saccharomyces cerevisiae, "old process", converted desthiobiotin even in the presence of biotin to biotin-like substances active for *L. arabinosus* and *L. casei*, but not for *R. trifolii* 205. *N. sitophila*, however, was able to convert desthiobiotin under the same conditions to substances active for all three test organisms. *S. fimicola* and *C. pini* did not produce any biotin from desthiobiotin when tested by *L. arabinosus*, *L. casei*, or *R. trifolii* 205.—E. KODICEK.

See also absts. **1664** (staphylococci), **1578** (*Str. vaginalis bovis*), **1508**, **1635** (mastitis), **1563** (staphylococci), **1557** (*Bact. coli*), **1556**, **1558**, **1559**, **1641**, **1642** (clostridia), **1636** (strangles), **1637**, **1638**, **1665** (TB.), **1639** (leprosy), **1640** (tularaemia), **1661**, **1666** (salmonella), **1643** (fungi), **1630–1633** (antibiotics).

DISEASES CAUSED BY PROTOZOAN PARASITES

HETZEL, H., & SZEPESHELYI, A. (1944.) Beitrag zur Frage der Pathogenität des Trichomonas fetus. **[The question of the pathogenicity of *Trichomonas foetus*.]** —*Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* May 12th. 149–153. [Originally appeared in **Kozl. Összehas. élet- és kórtan Köréből.* **32.** 1. (1943.) Abst. in *Tierärztl. Z.* No. 2. p. 30. (1944).] **1520**

The authors consider that the results of their investigations do not confirm the views of others that *T. foetus* is pathogenic. They believe, in common with some other investigators, that this protozoon possesses no disease-producing activity and only occasionally lives in the vagina and uterus of cows. In support of their views they quote results obtained by a Commission of Sterility Specialists working under the aegis of the Hungarian Ministry of Agriculture. The Commission tested for trichomoniasis and made microscopical examinations of vaginal secretions. Some 3,000 beasts were examined and no trichomoniasis was evident; 68 cows were infected by trichomonads but no inflammation of the vagina was observed. 32 animals were definitely in calf. H. considers that trichomonads do not cause disease but merely live harmlessly in the vagina and uterus which have become diseased from other causes. [These conclusions are based on insufficient evidence.] —C. HORTON SMITH.

REICHENOW, E., & MUDROW, L. (1943.) Der Entwicklungsgang von *Plasmodium praecox* im Vogelkörper. **[Development of *Plasmodium praecox* (= *relictum*) in birds.]**—*Dtsch. tropenmed. Z.* **47.** 289–299. **1521**

Sporozoites of *P. relictum* were injected into the tissues of canaries and the exo-erythrocytic cycle was studied. Only a few of the sporozoites which were injected penetrated the cells of the reticulo-endothelial system and continued their development. These sporozoites round up and after 4 hours start growing; at 16 hours the first nuclear division takes place. Six divisions usually occur before segmentation into merozoites takes place. The whole process from sporozoite formation to mature schizont occupies 36 hours. The number of viable merozoites formed from the schizont varies between 32 and 64. Schizonts and merozoites are produced as before in the cells of the r.e.s. Two types of schizonts are produced in the third cycle. In one type many nuclei are formed and in the other a smaller number. The merozoites derived from the schizont with many nuclei are small and are known as micromerozoites; the merozoites derived from the schizonts with fewer nuclei are large and are called macromerozoites. The micromerozoites eventually enter the red blood cells to commence the erythrocytic phase of development. The macromerozoites, on the contrary, enter the cells of the r.e.s. In the fourth and fifth endothelial cycles most of the schizonts are microschizonts and no trace has been found of further endothelial development after this stage. The r.b.c. are invaded by micromerozoites at the end of the third endothelial cycle and the majority of them develop into schizonts. Some of the micromerozoites first developed show differentiation and develop into gametocytes. As the first micromerozoites which enter r.b.c. all become mature at the same time there is a high degree of synchronism, but as the number of micromerozoites increases the synchronism is quickly lost. The authors emphasize that these observations apply only to a particular strain of *P. relictum*.—C. HORTON SMITH.

PARAENSE, W. L. (1944.) O ciclo exoeritrocitário dos parasitos da malária. **[The exo-erythrocytic cycle of malaria parasites.]**—*Mem. Inst. Osw. Cruz.* **41.** 469–493. **1522**

The evidence as to the nature of the exo-erythrocytic forms of malarial parasites and their importance in the development cycle are discussed. It is pointed out that previous to their discovery it was known that quinine treatment was more efficacious in human malaria produced by blood inoculation than in that produced by the inoculation of sporozoites, relapses being much more common in sporozoite-induced malaria. Work on fowl malaria shows that on injection of sporozoites multiplication occurs at the point of inoculation, followed by an invasion of the endothelial system. After a time, which corresponds with the incubation period, parasites invade the blood stream and penetrate the erythrocytes where they become pigmented, the pigment being derived from haemoglobin. It is suggested that at the same time the schizogonous cycle in the endothelial cells continues. The evidence as to whether the erythrocytic forms can reinvade the endothelial system is somewhat conflicting, but the efficacy of quinine treatment in infections due to blood inoculation argues that they do not do so and that when endothelial infection develops from blood inoculation, it is due to the presence of endothelial cells in the inoculated blood.

Exo-erythrocytic forms have not been detected in all malarias, even of birds, and the large amount of tissue which would have to be examined makes their detection difficult in man, but their occurrence has been claimed in all three forms of human malaria. This evidence of their occurrence is supported by the reaction of human disease to quinine treatment.—U. F. R.

TALIAFERRO, W. H., & TALIAFERRO, L. G. (1944.) **The effect of immunity on the asexual reproduction of *Plasmodium brasilianum*.**—*J. infect. Dis.* **75.** 1–32. **1523**

This study of asexual reproduction in major and minor broods during initial infections and relapses of 14 strains of the quartan parasite *P. brasilianum* in 64 monkeys belonging to six species of Central American monkeys showed significant changes in the synchronicity in all marmosets and night monkeys during the entire infection and in some *Cebus*, spider and howler monkeys during the parasite decline; changes were also observed in the average number of merozoites per segmenter in both types of broods during the entire malarial infection in the majority of monkeys of all species, and in the periodicity and morphology of the parasites at the time of the crisis or parasite decline in some monkeys of all species. From all the data accumulated by this and previous work it is evident that natural immunity is associated with the death of the parasites and also with a sporadic variation in asexual reproduction. Acquired immunity, with natural immunity, results in increased death of the parasites and a marked lowering of asexual reproduction. In some animals there is a marked lowering of asexual reproduction during sharp crises as a result of an upset of the asexual cycle with lack of synchronicity and a lengthening of the cycle in some parasites and, secondly, a reduction in the number of merozoites in some segmenters as well as the appearance of degenerate crisis forms. The authors suggest that many metabolic functions may be depressed, causing death of some of the parasites as shown by crisis forms, and that variable retardation of the growth of others may cause a delay in the average length of the asexual cycle, a loss of synchronicity and a lowering of the mean number of merozoites per segmenter. Loss of activity and lowered body temperature of host may also be responsible for these changes.—C. HORTON SMITH.

*NERI, M. (1941.) Contributo sperimentale allo studio

della piroplasmosi del cane. **[Experimental study of canine piroplasmosis.]**—*Riv. milit. Med. vet., Roma.* **4.** 355. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* August 20th. 285. (1943).] **1524**

Transmission of *Babesia canis* was regularly successful with the tick *Rhipicephalus sanguineus*. The incubation period was 6–7 days with a peak of the disease in 2–3 days, recovery taking 1–2 months. Blood counts revealed a slight decrease in monocytes, a decrease of neutrophiles and an almost complete disappearance of eosinophiles during the febrile period. Invaded erythrocytes showed a decrease in specific gravity, so that when blood was centrifuged they became concentrated in the upper layer of the corpuscular deposit.—U. F. RICHARDSON.

VERGE. (1945.) La transmission à l'homme des spirochétoses (leptospiroses) canines. **[Infection of man with leptospira from dogs.]**—*Rev. Path. comp.* **45.** 365–368. **1525**

Human cases of *L. icterohaemorrhagiae* infection, apparently contracted from infected dogs, have been recorded from Germany, France, Britain, Denmark and America. In one outbreak in Berlin, in which dogs were believed to have been the source of infection, 60 human cases occurred.

L. canicola infection in man has been recorded in Holland, Germany, Austria, Britain, France, America and China, usually occurring in individuals in close contact with infected dogs. This infection in man is anicteric, febrile, and often associated with symptoms of meningitis, but never fatal.

Spirillum morsus-muris infection has been recorded in man after operations on dogs, and from the bites of cats, ferrets and polecats.—U. F. RICHARDSON.

STAVITSKY, A. B., & GREEN, R. G. (1945.) **Susceptibility of the young white mouse (Mus musculus) to experimental leptospirosis.**—*Science.* **102.** 352–353. **1526**

In view of LARSON'S [*V. B.* **11.** 853 & **12.** 207] report that young white mice (*Mus musculus*) were extremely sensitive to infection with *Leptospira icterohaemorrhagiae* and were suitable animals to use for protection tests, the white mice of the bacteriological laboratory of the University of Minnesota Medical School were tested for susceptibility. None of the injected mice developed frank leptospirosis, although organisms could be isolated from the blood, kidneys and liver during the first week after inoculation. It is suggested that there may be genetic differences within species in resistance to leptospirosis; other studies suggest that the humoral rather than the cellular defensive reactions of the host are the important factor.
—U. F. RICHARDSON.

See also absts. **1529** (protozoan parasite in rabies), **1644, 1681, 1682** (trypanosomiasis), **1645–1647** (coccidiosis).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

*BELLER, K., & BIELING, R. (1942.) Viruskrankheiten. Tl.2. Die Viruskrankheiten der Haus- und Laboratoriumstiere, ihre Erreger und ihre Bekämpfung. **[Virus diseases. Part II. Virus infections of domestic and laboratory animals, their aetiology and control.]** pp. ix + 237. Leipzig: Johann Ambrosius Barth. RM. 11. [Abst. from review in *Jber. Vet.-Med.* **71.** 219–220.] **1527**

This volume is a sequel to BIELING'S "Virus diseases of man". The aetiology, course, clinical signs, pathology, development of immunity and control of the various virus diseases of domestic and laboratory animals are discussed. Sections are included dealing with the rickettsia, bartonella, grahamella, bacteriophages, and the transmission of virus diseases of animals to man. The German reviewer comments favourably on the authors' concise and clear presentation of their subject.—W. M. HENDERSON.

WEBSTER, W. J. (1944.) **Rabies and antirabic treatment in India.** pp. 17. Simla: Govt. India Press. 8vo. Annas 9 or 10d. **1528**

This pamphlet contains much useful information in a concise form, dealing with the clinical symptoms of the disease in animals and man, the mode of infection and treatment. The methods of laboratory procedure in the diagnosis of the disease, the removal and preservation of the brain, and the procedure to be adopted in collecting and delivering such material to the laboratory are also discussed.—D. A. MUNRO.

VEERARAGHAVAN, N. (1944.) **A protozoan parasite of the central nervous system.**—*Indian J. med. Res.* **32.** 207–222. **1529**

An organism, believed to be a protozoon, was found to be associated with natural and experimental rabies infection in dogs, jackals, a cat and g. pigs. The morphology is detailed. Various stages in the life-cycle were seen in the mid-brain and certain stages were filtrable. The relationship to Negri bodies is discussed and it is suggested that Negri bodies may represent a stage in the life-cycle of the parasite.—H. N. RAY.

TROPA, E. (1944.) Première note sur l'appréciation de valeur antigène des émulsions vaccinales antirabiques au moyen du virus fixe. **[An appreciation of the antigenic value of antirabic vaccinal emulsions by means of the fixed virus.]**—*Rev. Med. vet., Lisboa.* **39.** 243–245. [In French.] **1530**

Three vaccines were prepared by making a 10% suspension of the brain and cord of dogs infected with fixed virus in the following diluents: (1) 60% glycerol plus 0·31% phenol in distilled water; (2) 1% phenol in saline and (3) 0·5% formaldehyde in saline. Vaccines were then stored in the dark at 18°–22°C. for 14 days and administered to groups of dogs in doses of 10 ml. daily for varying periods. In no case did a single injection of vaccine confer satisfactory immunity against injection of virus three weeks later. A total dose of 20 ml. or more of the first vaccine produced immunity in a total of 11 dogs; a total dose of 60 ml. of the second vaccine protected three dogs, but with the third vaccine only six dogs out of eight were protected by 60 ml.

T. draws attention to the fact that the immunizing dose corresponds to that established for Fermi's phenolic vaccine by REMLINGER & BAILLY.—H. G. ARAMBURU.

ANON. (1946.) **Rinderpest, the preparation of tissue and egg vaccines.**—*Amer. J. vet. Res.* **7.** 133–134. **1531**

SHOPE, R. E., GRIFFITHS, H. J., & JENKINS, D. L. (1946.) **Rinderpest. I. The cultivation of rinderpest virus in the developing hen's egg.**—*Ibid.* 135–141. **1532**

WALKER, R. V. L., BAKER, J. A., & JENKINS, D. L. (1946.) **Rinderpest. II. Certain immunity reactions.**—*Ibid.* 142–144. **1533**

WALKER, R. V. L., GRIFFITHS, H. J., SHOPE, R. E., MAURER, F. D., & JENKINS, D. L. (1946.) **Rinderpest. III. Immunization experiments with inactivated bovine tissue vaccines.**—*Ibid.* 145–151. **1534**

SHOPE, R. E., MAURER, F. D., JENKINS, D. L., GRIFFITHS, H. J., & BAKER, J. A. (1946.) **Rinderpest. IV.**

Infection of the embryos and the fluids of developing hen's eggs.—*Ibid.* 152–163. **1535**

MAURER, F. D., WALKER, R. V. L., SHOPE, R. E., GRIFFITHS, H. J., & JENKINS, D. L. (1946.) **Rinderpest. V. Attempts to prepare an effective rinderpest vaccine from inactivated egg-cultivated virus.**—*Ibid.* 164–169. **1536**

SHOPE, R. E., & GRIFFITHS, H. J. (1946.) **Rinderpest. VI. The persistence of virus in chicks hatched from infected eggs.**—*Ibid.* 170–173. **1537**

JENKINS, D. L., & SHOPE, R. E. (1946.) **Rinderpest. VII. The attenuation of rinderpest virus for cattle by cultivation in embryonating eggs.**—*Ibid.* 174–178. **1538**

BAKER, J. A. (1946.) **Rinderpest. VIII. Rinderpest infection in rabbits.**—*Ibid.* 179–182. **1539**

JENKINS, D. L., & WALKER, R. V. L. (1946.) **Rinderpest. IX. Neutralization tests in rabbits as measure of the immune responses in calves to vaccination against rinderpest.**—*Ibid.* 183–188. **1540**

BAKER, J. A., TERRENCE, J., & GREIG, A. S. (1946.) **Rinderpest. X. The response of guinea pigs to the virus of rinderpest.**—*Ibid.* 189–192. **1541**

MAURER, F. D. (1946.) **Rinderpest. XI. The survival of rinderpest virus in various mediums.**—*Ibid.* 193–195. **1542**

BAKER, J. A., & GREIG, A. S. (1946.) **Rinderpest. XII. The successful use of young chicks to measure the concentration of rinderpest virus propagated in eggs.**—*Ibid.* 196–198. **1543**

HALE, M. W., & WALKER, R. V. L. (1946.) **Rinderpest. XIII. The production of rinderpest vaccine from an attenuated strain of virus.**—*Ibid.* 199–211. **1544**

HALE, M. W., WALKER, R. V. L., MAURER, F. D., BAKER, J. A., & JENKINS, D. L. (1946.) **Rinderpest. XIV. Immunization experiments with attenuated rinderpest vaccine including some observations on the keeping qualities and potency tests.**—*Ibid.* 212–221. **1545**

ROBEY, T. O., & HALE, M. W. (1946.) **Rinderpest. XV. Morphological changes in the blood of young cattle during rinderpest and after vaccination with attenuated virus vaccine.**—*Ibid.* 222–227. **1546**

COOPER, H. K. (1946.) **Rinderpest. XVI. Complement fixation test for rinderpest.**—*Ibid.* 228–237. **1547**

The above papers, published together in a special number, record work done during the war in Canada on an island in the St. Lawrence River. For security reasons the papers could not be published at that time. A foreword explains that in 1941 serious concern was felt lest rinderpest be introduced into North America by the enemy; as a result, a joint Canadian and United States Commission was appointed to study the question. The Commission appointed a staff of American and Canadian scientists to prepare a tissue vaccine according to methods already known "in order to provide rapidly the means of surrounding an epizootic, should it occur, with a ring of immunized animals" and to investigate the possibility of developing an efficient vaccine which could be produced more economically and without requiring the use of large numbers of animals. [No information is given as to the considerations which led the Commission to this decision. It is presumed that had the necessity arisen, vaccine would have been used to supplement a slaughter policy, as experience in Belgium, Australia and Brazil after the 1914–18 war proved this to be a highly efficient method of dealing with rinderpest when newly introduced into a "clean" country.] The third paper in the series describes the preparation by existing methods of both chloroform- and formalin-inactivated vaccines. It was considered that the chloroform-inactivated vaccine was at least as good as the formalin-inactivated vaccine and a stock of this was prepared. No field trials were possible but it was recommended that under field conditions the chloroform vaccine should be used in a single dose of 20 ml.

The remaining papers deal with successful attempts to cultivate the virus in developing hen's eggs, its attenuation by serial passage to such a degree that it could be used as a vaccine, and with rinderpest in rabbits, g. pigs, etc.

The workers had at their disposal an ample supply of highly susceptible cattle and excellent facilities for isolation. Very elaborate precautions were taken to prevent accidental infection of the experimental animals or escape of the virus from the island. Details are not given as to the sources from which viruses were obtained but it appears that a number of strains were supplied from different parts of Africa and from India. [One of these, described as caprine virus, was presumably the goat-adapted virus developed by EDWARDS, which has been used on a very large scale in India and Africa.]

Cultivation in the developing hen's egg was accomplished using "an African bovine strain" after some preliminary difficulties due to fluctuation in the electricity supply and defects in the thermo-regulation of the incubator. The method adopted consisted in incubating fertile eggs at a temperature between 37°–39°C. On the 10th day 0·2 ml. of a 10% suspension of spleen tissue in broth from a calf affected with rinderpest and killed on the second or third day of fever was dropped on to the chorio-allantoic membrane. To do this a window was cut out in the eggshell over the region of the embryo and the air sac was collapsed by suction through a small hole bored in the air sac end of the egg. This created an artificial air sac under the opening in the shell and exposed a large area of chorio-allantoic membrane. The window in the shell was sealed by tape and the small opening at the air sac end by sealing wax.

The inoculated eggs were incubated for three days and then opened for serial passage. The inoculated portion of the chorio-allantoic membrane was exposed by cutting away the shell with scissors. The exposed chorio-allantoic membrane and the underlying amniotic membrane were removed aseptically. About 3 ml. of the combined allantoic and amniotic fluids were removed by a pipette. The fluid and membranes from three eggs were collected in this manner and were ground together in a glass mortar, 0·2 ml. of the resulting suspension being used to inoculate each egg of the subsequent passage. Virus was proved to be present by inoculating susceptible calves with suspension of the membranes. No lesions pathognomonic of rinderpest were obtained on the inoculated membranes although the chorio-allantoic membrane was usually thickened, grey and oedematous. The preliminary experiments showed that in eggs incubated for three days the virus was present in the membranes but not in the fluids or embryo, that the temperature of incubation was of importance and that the concentration of virus in the membranes was high. [This successful cultivation of the virus on the chorio-allantoic membranes confirms the work done at Mpwapwa and Dar-es-Salaam by KUNERT in 1938—see *V. B.* **9.** 536.]

Following the success attained with growth on the membranes, work was continued with the object of obtaining multiplication of the virus in the embryo and fluids as well as in the membranes. Inoculation of the virus into the allantoic sac and into the amniotic sac was tried, but neither route proved satisfactory. In preliminary attempts at inoculation direct into the yolk

sac no multiplication of virus was obtained, but varying the procedure by starting with virus which had been under cultivation on the chorio-allantoic membrane for several passages instead of with bovine spleen virus, and by using eggs which had been incubated for seven days and harvesting after four days, instead of the usual three days, growth was obtained and the virus was readily demonstrated in the embryo. Once growth had occurred no difficulty was encountered in continuing the passages by inoculation of embryo suspensions into the yolk sac. It was also found that virus was present in the allantoic and amniotic fluids and that these constituted suitable inocula. The titre of virus in embryos infected *via* the yolk sac approximated that in bovine spleen or lymphatic tissues.

The rinderpest virus did not appear to exert any very deleterious effect on the developing embryos. A number of them died from some cause not definitely determined, but some infected eggs actually hatched and the chicks appeared to be normal.

Further attempts were made to infect eggs by inoculation into the yolk sac with virus of bovine origin, but while some initial multiplication seemed to take place in the first passage it was not possible to continue serial passages with such material. It was shown that preliminary cultivation on the membranes for 8–12 passages was necessary before virus could be serially passaged *via* the yolk sac. Multiplication in the embryo and fluids having been obtained, inactivated vaccines using chloroform and also formalin were prepared from macerated embryos, yolk sacs and membranes, but no satisfactory immunity could be established in susceptible calves by such vaccines. It was believed that this failure was due not to any lack of potency in the virus but rather to the presence of interfering protein in the embryo or egg material.

In the course of work with the egg-passaged virus evidence of attenuation was obtained. Attenuation was more regular and uniform in virus passaged by yolk-sac inoculation than in virus passaged on the chorio-allantoic membrane. Attenuation appeared to occur more rapidly when passages were made at 48-hour intervals instead of the usual three or four days. By the 67th and subsequent passages *via* the yolk sac, attenuation had reached the stage where the virus when inoculated into susceptible calves produced no clinical symptoms of illness beyond a slight rise of temperature on the 4th, 5th and 6th days. Calves which had been inoculated with the attenuated virus were shown to be solidly immune when challenged with virulent bovine virus. Some immunity was present as early as four days after injection, indicating that the protection had the character of an interference phenomenon. [Similar early appearance of immunity was observed by PFAFF using goat-adapted virus—see *V. B.* **9.** 623 and **10.** 758.] Calves infected with the egg-attenuated virus did not transmit infection to healthy calves placed in contact with them in the few trials which were made.

The next stage in the investigation was further study of the use of this attenuated virus as a vaccine.

Non-infectivity by contact was confirmed by a further trial in which ten calves infected with the attenuated virus were placed in contact with four healthy calves in the same pen. The four uninoculated calves remained healthy and were later proved to be susceptible to rinderpest. This experiment is considered to provide sufficient evidence that there is no transmission by contact.

Transmission by inoculation of blood taken from a reacting calf was shown to be possible; with serial transmission in this way virulence was regained and by the sixth passage the virus was sufficiently virulent to kill a calf. The calf which died following inoculation with blood of the sixth passage transmitted infection to a healthy calf placed in contact with it. The conclusion is drawn that although virulence is regained by six passages with blood the material is "perfectly safe to use in the field, since wholesale transmission of blood from animal to animal is not a situation which is liable to occur" and it is suggested that all the animals in one vicinity be vaccinated at approximately the same time, leaving no susceptible animals to act as blood-passage calves. [Such a procedure might be practicable under North American conditions but is difficult to achieve in countries such as India and Africa where the disease is enzootic.]

A procedure is described for the production of egg-adapted virus on a large scale for use in the field. In discussion of the adaptation of bovine virus to the egg it is stressed that little or no attenuation is produced by even 90 serial passages on the chorio-allantoic membrane; on the other hand, attenuation is readily obtained by passage *via* the yolk sac. Preliminary cultivation on the membranes is, however, necessary before the virus can be induced to propagate by the yolk sac route. The number of preliminary passages necessary on the membranes apparently varies with different strains of virus. In some trials eight membrane passages were sufficient, while in others 15 or more were required. It is stated that the caprine strain [origin not described] was not adapted to yolk sac transmission after 19 membrane passages, but was capable of growth after 37 such passages. The "Indian" strain was not sufficiently adapted to grow in the yolk sac after 30 membrane passages, at which point the series was discontinued. The "North African" strain could not be transferred even by the chorio-allantoic route. [One would have wished to have further information on this question of variation in strains. Very little information is given on the subject, but one gets the impression that the bulk of the work was done with an East African strain for the reason that the "North African" strain could not be adapted to growth on the egg by any route, while "caprine" and "Indian" strains, although they grew on the chorio-allantoic membrane, proved difficult to propagate *via* the yolk sac.]

The procedure which is recommended may be summarized as follows. The bovine virus, collected from the spleen of calves killed 36–48 hours following the first rise of temperature, is adapted to the egg by preliminary passages on the chorio-allantoic membrane. It is then carried on by the yolk sac route. The eggs are incubated for ten days at 37°–39°C.; virus for passage is harvested 72 hours after inoculation of the egg. Since no characteristic macroscopic lesion is produced in the egg it is necessary to test for the presence of the virus at every fourth passage by inoculation of calves.

The number of yolk sac passages necessary to bring about the required degree of attenuation of the virus varies from 19 to 24 and can only be determined by tests on calves. There is danger of over-attenuation to such a degree that no immunity is produced. A supply of early passage material should therefore be maintained in the frozen state to provide seed material should this occur.

Mixed allantoic and amniotic fluids are used as seed and since the virus rapidly dies at room temperature they should be promptly frozen immediately after harvesting. At 2°C. virus remains viable for 10–14 days, while at −20°C. it will remain viable for at least a year. It was not possible to maintain the virus by drying the egg fluids. Such dried material will immun-

ize a calf but will not propagate when inoculated into eggs.

A supply of seed virus for vaccine production is prepared by inoculating 0·5 ml. of the frozen egg fluid into 60 seven-day-incubated fertile eggs *via* the yolk sac. The eggs are incubated at 38°C. for 72 hours. At the end of that time they are candled and those with dead or abnormal embryos are discarded. The remainder are frozen at –20°C. for 40 min.: they are then transferred to a refrigerator at 2°C. until harvested. The fluids are harvested by means of a syringe, 5–7 ml. being obtained from each egg. From 60 eggs at least 250 ml. may be collected. The pooled fluids are tested for sterility, diluted 1 : 10 with normal saline and well mixed.

For vaccine production about 300 eggs are incubated at a time. The inoculation is made in the same way as in the case of eggs for seed virus, but the eggs are incubated for 96 hours instead of 72. They are then candled as before.

The fluids are collected by means of a pipette and a pump, direct into a 9-litre bottle. The embryos are then collected with sterile forceps into a jar. The fluids are measured and the embryos weighed; the two are then milled together in an Eppenbach colloid mill, 10 minutes being the usual time required. After milling the mixture is drawn off into a 9-litre bottle and placed in the refrigerator at 2°C. for 1–2 hours. It is dispensed in 20 ml. quantities by means of a pipette into 60 ml. serum bottles. Immediately after filling and stoppering the vaccine is frozen by rotating the bottles horizontally in a bath of CO_2 ice and alcohol. After freezing they are kept in a freezer at –20°C. until they can be dried. The apparatus used for drying the frozen bottled vaccine is described in detail and illustrated. The process requires approximately 24 hours. Bacterial contamination is guarded against by aseptic technique at all stages and by test cultures of the finished product. It is almost impossible to obtain a completely sterile product. The drying process destroys a large percentage of the contaminating organisms. Vaccine containing "a slight amount of contaminating organisms" is not believed to be harmful and may be used. Each batch is tested for potency by reconstituting the dried virus in one bottle by adding 60 ml. of either distilled water, normal saline or phosphate buffer solution and injecting 0·5 ml. subcutaneously into a susceptible calf. The calf must fail to show any signs of serious illness for a period of 14 days and must then withstand a challenge dose of 100 M.L.D. of virulent bovine virus.

Other papers in the series deal with the reaction produced in vaccinated calves: this is either nil or purely thermal. In about 76% of vaccinated calves there was a rise to 104°F. or higher, which occurred usually on the 4th, 5th or 6th day, but exceptionally as early as the 2nd or as late as the 10th. In mature cattle the percentage which showed a thermal reaction was much lower than in calves.

In most experiments to determine the interval between vaccination and development of immunity, the challenge dose was given on the 14th day. One calf tested on the fourth day developed a temperature and became ill but recovered promptly. Heating to 60°C. for 30 min. destroyed the virus. Exposure to room temperature (22°C.) for 24 hours reduced the potency and after 72 hours it was quite inactive. Fluid vaccine held at 2°C. for 10 days gradually lost potency and by 14 days was inactive. Dry frozen vaccine held at –20°C. retained potency for one year.

Experiments on the infection of rabbits and g. pigs with rinderpest are described. Bovine virus inoculated intravenously did not produce any signs of illness in rabbits but virus was shown to be present in the spleen by inoculation of calves. By alternating passage between rabbit and calf for five passages it was possible to produce symptoms in rabbits. These were a sharp rise of temperature at the 36th to 48th hour, increased respiratory rate, refusal of food, malaise and occasionally diarrhoea. All the rabbits recovered and their sera were shown to contain antibodies. Rabbits could not be infected by any route other than the intravenous.

The use of rabbits for neutralization tests to measure the antibody content of serum is discussed. Attempts to infect g. pigs with virus in three forms, namely bovine, rabbit-adapted and egg-adapted were made. The egg-adapted virus caused neither illness nor the production of antibodies. The rabbit-adapted and the bovine viruses did not cause any sign of illness, but seemed to become established as evidenced by results of inoculation into calves and the production of antibodies.

A complement-fixation test, using as antigen mixed allantoic and amniotic fluids from infected embryos, is described. This test is said to have given excellent results for titrations of virus and for diagnostic purposes.

A study of the morphology of the blood of cattle in rinderpest showed that a leucopenia starting on the 3rd and 4th day after infection was characteristic. It persisted for 6–7 weeks in those cattle which recovered. The survival of virus in a number of diluting media was studied. M/10 phosphate buffer at pH 7 was superior to either normal saline, distilled water or amniotic and allantoic fluids from normal 11-day-incubated eggs.

In a short paper dealing with the persistence of the virus in chicks it is stated that the virus is present in the brain and other viscera of chicks hatched from eggs infected with rinderpest and may persist for as long as five days. Healthy day-old chicks could not be infected with rinderpest viruses administered by way of the unabsorbed yolk sac intraperitoneally, intrathoracically, intranasally, subcutaneously, by feeding or by scarification. Administered intracerebrally, the virus could be demonstrated for at least eight days but could not be transmitted in series from chick brain to chick brain.

[This collection of papers records a very important piece of work and should be studied in the original by all workers on rinderpest. The vaccine is stated to be under trial in the field in East Africa and the results are awaited with interest. The conditions on the island where the work was done, especially the practically unlimited supply of highly susceptible cattle which was available, were favourable for the solution of a number of problems of immunity in rinderpest which are difficult to study in countries where the disease is enzootic. The reference in the foreword to "native cattle which are more highly susceptible to the disease than European breeds" is contrary to the general experience of those familiar with the disease in Asia and Africa.]—M. C.

ANON. (1945.) **Immunization against swine fever.**—*J. Minist. Agric.* **52.** 374–376. **1548**

The injection of S.F. crystal-violet vaccine into healthy susceptible pigs gives rise to a strong immunity generally lasting at least 12 months. It has no adverse effect on the health of the animals. Pigs may be injected from the age of three weeks upwards, but the immunity following injection before weaning tends to regress more quickly than that following later injection.

From tests carried out at Weybridge, it appears that English strains of S.F. virus, although immunologically similar, vary in their virulence, and on the whole are less virulent than the American strain of virus used in the production of the vaccine.—I. W. B.

LAKTIONOVA, A. I. (1940.) Dezinfektsiya khlorom stochnykh vod biofabrik, izgotovlyayushchikh virus i syvorotky protiv chumy svinei. [**Chlorine disinfection of waste water from works preparing swine fever virus and antiserum.**]—*Rabot. XIII Plen. vet. Sekt. Akad. sel'khoz. Nauk, Moscow, 1939.* [*Collected Works.*] pp. 152–158. **1549**

Untreated sewage effluent from a factory preparing swine fever antiserum and virus, contained a high percentage of organic matter in the form of blood, urine, faeces, pieces of tissue and a large amount of S.F. virus. Such effluent injected into piglets rapidly resulted in their death from S.F. Filtering the fluid through a Seitz filter rendered it harmless to the piglets and this was attributed to adsorption of the precipitated particles of the already rather diluted virus.

The virus was known to be very susceptible to the action of chlorine, and experiments leading to the successful application of this chemical for the detoxification of such effluent are described in detail.

If the waste water is allowed to settle for at least one hour, a concentration of 60 mg. active Cl_2 per litre of fluid disinfects it satisfactorily.—L. LEVENBOOK.

JANSEN, J. (1942.) Experimenteel onderzoek van konijnensterfte door een filtreerbaar virus. [**Research on a virus disease of rabbits.**]—*Tijdschr. Diergeneesk.* **69.** 505–514. [Abst. from abst. in *Wien. tierärztl. Mschr.* **30.** 152.] [See also *V. B.* **12.** 584 & **14.** 271.] **1550**

J. describes a new virus disease of rabbits in which the virus can be demonstrated in all the parenchymatous organs, nasal secretions, urine, blood and sometimes bile. Symptoms are usually confined to a watery nasal discharge, loss of appetite and dullness, with occasional nervous symptoms. Mortality is 20–80%. The disease is easily transmitted to healthy rabbits by peritoneal inoculation or oral administration of bacteria-free filtrates, or by contact; the incubation period after artificial infection is 7–10 days. The chief pathological changes are small irregular light-coloured spots in the liver and lungs. The virus remains viable for some time in dried organs or 50% glycerin.—A. F. R.

I. TRAUB, E. (1943.) Über einen Adsorbatimpfstoff zur aktiven Immunisierung gegen die atypische Geflügelpest. [**An adsorbate vaccine for atypical fowl plague.**]—*Berl. Münch. tierärztl. Wschr.* pp 39–42. **1551**

II. TRAUB, E. (1944.) Weitere Mitteilungen über die aktive Immunisierung mit Adsorbatimpfstoffen gegen die atypische Geflügelpest. [**Adsorbate vaccine for "atypical fowl plague".**]—*Z. InfektKr. Haustiere.* **60.** 367–379. **1552**

I. "Atypical fowl plague", a disease of fowls that first appeared in Germany in 1941, was found to be due to a virus distinct from classical fowl plague virus and probably similar to if not identical with that of Newcastle disease (owing to war conditions, a strain of the latter was not available for comparison). The disease differs from infectious laryngo-tracheitis, the typical intranuclear inclusion bodies of that disease not being present. The present article describes the production of a vaccine against "atypical fowl plague" using developing chick embryos; the virus was adsorbed on $Al(OH)_3$ and inactivated with formalin. A single dose was given intramuscularly to the fowls to be immunized.

II. In laboratory experiments, the vaccine protected fowls for at least eight months against infection by inoculation or contact. No evidence was obtained that carriers were produced by the vaccination. The vaccine maintained its potency for eight months at 4°C. Some slight immunological differences were observed among strains of virus from different localities, so that a multivalent vaccine was desirable. In the field, the vaccine proved its value in a widespread outbreak of "atypical fowl plague".—E. COTCHIN.

•GROSS, W. O. (1943.) Ätiologie infektiöser Pneumonien der weissen Maus und ihre Beziehungen zur Influenzaätiologie des Menschen. [**Aetiologic relationship of infectious pneumonia of the white mouse to human influenza.**]—*Klin. Wschr.* pp. 335–339. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **144.** 451.] **1553**

An epidemic of influenza in human beings coincided with that of a type of influenza in pigs. It was suggested that the animals were infected by an attendant or by foodstuffs infected with human influenza virus, as serological examinations showed that the disease in pigs was caused by the human type of virus (influenza A). The virus could not be isolated from the nasal secretions of the diseased animals.—J. ZWEIG.

NEITZ, W. O. (1944.) **The susceptibility of the springbuck** (*Antidorcas marsupialis*) **to heartwater.**—*Onderstepoort J. vet. Sci.* **20.** 25–27. **1554**

The detection is recorded of rickettsial colonies indistinguishable from those of *Rickettsia ruminantium* in intima smears and sections of the hippocampus from a dead springbuck, but transmission experiments to sheep by inoculation of emulsions of tissues or of a saline emulsion of a specimen of *Amblyomma hebraeum* were negative.

It is suggested that the conclusion that the springbuck died from heartwater is not entirely unwarranted, and that any attempt to eradicate heartwater from an area where game has not been eliminated is doomed to failure.—U. F. RICHARDSON.

PALMEIRO, J. M. (1944.) Nota sôbre a riquetsiose ocular ovina em Portugal. [**Rickettsial conjunctivitis of sheep, cattle and pigs in Portugal.**]—*Rev. Med. vet., Lisboa.* **39.** 537–540. **1555**

Rickettsial conjunctivitis is recorded in cattle, goats and sheep in Portugal with the usual sequence of conjunctivitis, keratitis, ulceration and spontaneous recovery. The rickettsia could be identified in smears as large plaques, elementary bodies and bacillary forms. Experimentally the infection could be transmitted from cattle to sheep and from sheep to calves. Rickettsial bodies could also be identified in the conjunctival mucous membrane of swine infected with swine fever, but they were not seen in healthy swine, nor were attempts to transmit them from pig to pig successful.—U. F. R.

ZHURAVLEV, P. M., KOKIN, G. A., & POKROVSKAYA, M. P. (1944.) Fagoterapiya i fagoprofilaktika gazovoi gangreny. [**Treatment and prophylaxis of gas gangrene with bacteriophage.**]—*Zh. Mikrobiol., Moscow.* No. 9. pp. 44–49. [Abst. in *Bull. War Med.* **5.** 604, copied *verbatim.* Signed: D. J. BAUER.] **1556**

A mixture was made in saline of the phages for *Cl. welchii* (50 per cent.), *oedematiens* (25 per cent.) *histolyticum* (10 per cent.), *septicum* (10 per cent.), and *putrificum* (5 per cent.). At operation, up to 300 c.c. of the mixture were injected intramuscularly, to form a barrier around the wound. The intramuscular injection was repeated next day, and 100–300 c.c. were injected intravenously. Three or four injections were given, or more in severe cases. In a series of 1,200 cases treated with bacteriophage the mortality was reduced "to one-third" [this is not more clearly stated]. The general condition improved, the progress of the lesion was arrested, and the wound became clean and covered with granulations.

In prophylaxis, the phage mixture was injected mixed with 1 per cent. novocain just before operation;

if general anaesthesia was used, the mixture was given intravenously.

BORDET, P., & BEUMER, J. (1942.) Corrélation entre la reproduction du bactériophage et la formation de substance inhibitrice par la bactérie sensible. **[Correlation between bacteriophage production and the formation of inhibiting substance by sensitive bacteria.]**—*Schweiz. Z. Path. Bakt.* **5.** 265–274. [In French: English, German and Italian summaries.] [Abst. from English summary.] **1557**

The authors described a strain of *Bacterium coli* sensitive to two distinct 'phages, called the "strong" and "weak". When cultured below 20°C. the strain loses its sensitivity to the "weak" 'phage and no longer produces a specific inhibitory substance against it, but preserves its sensitivity to and continues to produce its inhibitory substance against the "strong" 'phage.

See also absts. **1478** (virus in neurotropic streptococci), **1579** (fatal syncope in pigs), **1580** (infectious coryza), **1648** (bovine infectious bronchopneumonia), **1649** (Rocky Mountain spotted fever), **1680** (foot and mouth disease), **1682** (rinderpest).

IMMUNITY

OGLOBLINA, L. S., & PONOMAREVA, N. A. (1944.) Deĭstvie nizkikh temperatur na immunogennye svoĭstva stolbnyachnovo anatoksina. **[Effect of low temperatures on the antigenicity of tetanus toxoid.]** —*Zh. Mikrobiol., Moscow.* No. 9. pp. 51–52. [Abst. in *Bull. Hyg., Lond.* **20.** 364, copied *verbatim.* Signed: D. J. BAUER.] **1558**

Tetanus toxoid was kept at −30° and −50°C. for ten days and then thawed out. It still retained its original antigenicity and lack of toxicity, and was still suitable for active immunization.

KHABAS, I. M., & PANIN, F. T. (1944.) Opredelenie in vitro antigennykh svoĭstv anatoksina B. perfringens po evo antitoksinsvyazyvayushcheĭ sposobnosti. **(Antitoxin-fixing power as a means of determining the antigenicity of *Clostridium welchii* toxoid.]**—*Zh. Mikrobiol., Moscow.* No. 9. pp. 33–38. [Abst. in *Bull. Hyg., Lond.* **20.** 363, copied *verbatim.* Signed: D. J. BAUER.] **1559**

Toxoid was added to a series of dilutions of standard antiserum. The tubes were shaken and incubated at 37°C. for 45 minutes; 0·1 cc. of fresh toxin was then added to each, followed by further incubation for 45 minutes and addition of 0·1 cc. of inactivated human serum. The reaction was read after 16 hours and at 37°C.; those tubes which contained excess serum were clear, while those with excess toxin were opalescent. Thus the number of units of antitoxin fixed by 0·1 cc. of toxin could be found.

The test could also be carried out by adding a series of dilutions of toxoid to a fixed quantity of antiserum.

The test was used in the investigation of the method of formation of toxoid when formalin was added to toxin. In the first 24 hours of incubation 25 per cent. of the toxin activity was lost; inactivation was still incomplete after 14 days.

HODGSON, A. E. (1944.) **Specific serum therapy in typhoid fever.**—*Brit. med. J.* Sept. 9th. pp. 339–340. **1560**

Typhoid fever antiserum containing both Vi and O antibodies has a high therapeutic value, particularly in toxaemic patients. Conditions due to toxaemia, excluding hyperpyrexia, abate rapidly after serum injection, obvious improvement often appearing within 48 hours although the temperature fall is less rapid. Complications such as intestinal haemorrhage and pneumonia, when present before the start of the serum treatment, do not seem to be mitigated. These conditions seem not to arise in the later course of the disease when serum has been given in the initial and toxic phase.—I. W. BROCKLEHURST.

HUGHES, W. H. (1945.) **Failure of immunity responses in localized disease.**—*Brit. med. J.* March 17th. 366–368. **1561**

Work on specific immunity in the human subject was carried out in the past upon diseases with a septicaemic phase (lobar pneumonia, typhoid fever, syphilis, etc.). The falsity of the supposition that localized diseases produce their own specific immune bodies, was shown by a series of examinations of the serological responses of patients with such conditions.

In a study of 48 such cases of varying duration in patients of from 22 to over 70 years of age, serological responses were found to be negative in most cases and very slight in the rest. The disease conditions studied were of the urogenital system, peritoneum, pleura, nasal sinuses, respiratory tract and meninges. The explanation is offered that fibrin forms a selective membrane which excludes some of the protein molecules together with larger particles.

[It is interesting to speculate upon the extent to which these findings may apply to localized conditions in animals, particularly those of the bovine udder.] —J. C. BUXTON.

GOTTSCHALL, R. Y., LAURENT, D., DEKRUIF, P., SIMPSON, W. M., KENDELL, H. W., & ROSE, D. L. (1945.) **The effect of artificially induced fever on humoral antibodies and on histamine intoxication in the guinea pig.**—*J. Lab. clin. Med.* **30.** 563–576. [Authors' summary copied *verbatim.*] **1562**

An artificially induced fever temperature of 42·2°C. maintained for thirty minutes has no effect upon the humoral precipitin titer of guinea pigs immunized against horse serum.

The antiprotein titer of sensitized guinea pigs is not significantly altered by a fever temperature of 42·2°C. maintained for sixty minutes when the serum is titrated by a modified Prausnitz-Küstner reaction.

A fever temperature of 42·2°C. maintained for thirty minutes suppresses histamine shock.

In vitro tests with surviving normal intestine exposed to histamine indicates that there is less contraction at 43·3, 45·0, or 46·0°C. than at 38·8 or 39·0°C. Response of sensitized intestine to the specific antigen (ovalbumin) is also decreased by temperatures of 43·3, 45·0, or 46·0°C.

The immediate type of reaction in the guinea pig's skin is suppressed by a fever temperature of 42·2°C. maintained for sixty minutes when the locally sensitized tissue is injected with the specific antigen during hyperpyrexia.

BØE, J. (1944.) **Investigations on the Duran-Reynals spreading factor in staphylococci.**—*Acta path. microbiol. Scand.* **21.** 587–595. [In English.] **1563**

A number of strains of *Staphylococcus aureus* were examined for the presence of the "spreading factor". There was no correlation between the content of "spreading factor" and the virulence of the strains or their haemolysin content. Since an antibacterial serum could prevent the effects of the "spreading factor" *in vivo* whilst the corresponding antitoxic serum could not,

it is suggested that the antibacterial serum contains antibodies other than antitoxin which are of importance in staphylococcal infections.

The presence of "spreading factor" was determined by the intracutaneous injection of filtrates of fresh cultures mixed with trypanblue. [The article contains no mention of hyaluronidase and the references do not go beyond 1939.]—E. G. WHITE.

See also absts. **1476** (staphylococcal anatoxin), **1484** (anthrax bacterins), **1487** (TB. allergy, immunity and immunization), **1491, 1492** (BCG vaccination), **1503, 1504** (sonic filtrates in brucellosis diagnosis and immunization), **1509-1511** (immunization against clostridia), **1513** (against tetanus), **1530** (rabies vaccines), **1531-1547** (rinderpest immunization), **1548, 1549** (swine fever immunization), **1551, 1552** ("atypical fowl plague" vaccine), **1567** (alcohol and tapeworm immunity), **1608** (Rh blood factors), **1686, 1687** (biological products).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

ZIMMERMAN, E. C. (1944.) **A case of bovine auricular myiasis and some ectoparasites new to Hawaii.**—*Proc. Hawaii. ent. Soc.* **12.** 199–200. **1564**

A case of myiasis of the ear of a cow due to *Chrysomyia megacephala* and *C. rufifaciens* is described. The occurrence in Hawaii of certain new ectoparasites is recorded. These include: the tick *Ornithodorus megnini* from the cow, the tropical fowl mite *Liponyssus bursa*, the sucking louse *Linognathus africanus* from the goat, the biting lice *Bovicola bovis* of bovines, *B. caprae* of the goat, *Felicola subrostrata* of the cat, and *Columbicola columbae* from the pigeon.—T. E. GIBSON.

MUTH, O. H. (1945.) **Tick paralysis in beef cattle due to Dermacentor Andersoni.**—*N. Amer. Vet.* **26.** 668. **1565**

Four weeks after 186 yearling Angus beef steers had been put on pasture infested with *D. andersoni* in central Oregon, three were found dead and 19 others exhibited symptoms of general paralysis. The herd was moved to a meadow two miles away and large numbers of ticks were removed from the animals by means of electric clippers and by scraping with knives. Several affected cases received a drench of cane molasses in water; recovery is said to have been rapid. After seven days, the cattle were returned to the original pasture, but no further cases occurred, although ticks were still present.—G. B. S. HEATH.

See also absts. **1501** (vectors of salmonella), **1524** (of *Babesia canis*), **1650-1654** (insecticides), **1667** (fixing and clearing of arthropods), **1678** (fly control).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

*ERICKSON, A. B. (1944.) **Helminth infections in relation to population fluctuations in snowshoe hares.**—*J. Wildl. Mngmt.* **8.** 134–153. [Abst. in *Exp. Sta. Rec.* **92.** 116, copied *verbatim*.] **1566**

The author has studied animal parasites in the gastrointestinal tracts of about 1,000 snowshoe hares collected by R. G. Green over almost one entire 10-yr. period (September 1931-December 30, 1940). The animals were taken during all seasons, and represented both sexes and all ages. The study included both the worm parasites and host reactions to their worm burdens.

Stomach worms, trichostrongylids, pinworms, and tapeworm larvae (*Taenia pisiformis*) apparently were important in reducing the resistance of hares to other decimating factors and in killing some animals outright by sucking blood (stomach worm and trichostrongylids), by utilizing food, by producing toxins (*Trichostrongylus calcaratus* and *T. affinis*, *Obeliscoides cuniculi*, and *Protostrongylus boughtoni*), and by causing erosion of the gastric glands, inflammation and thickening of the pyloric valve, spindle-cell sarcoma (stomach worms), liver damage (*Taenia pisiformis*), and lung damage (*P. boughtoni*), thus directly or indirectly influencing the decline of hare populations in Minnesota from 1935 to 1939.

LARSH, J. E., Jr. (1945.) **Effects of alcohol on natural resistance to the dwarf tapeworm in mice.**—*J. Parasit.* **31.** 291–300. **1567**

L. studied the action of alcohol on the resistance of white mice to infection with *Hymenolepis nana* var. *fraterna*. 45% alcohol given by mouth produced a definite reduction in the resistance to a test infection after 20 daily doses and some impairment of resistance within one week; 35% alcohol, however, required a longer period of time to produce a debilitating effect. 25% alcohol produced varying effects on resistance, while 10% produced no apparent effect. Little difference in effect was noted when the alcohol was given by mouth or by injection into the peritoneum and it is concluded that the effect is not due to any direct action on the gastric or intestinal mucosa. The amount administered in every case was 0·4 ml. The lowered natural resistance following the administration of alcohol disappeared within one week after the treatment was discontinued. One intoxicating dose (0·8 ml. of 25% alcohol) prevented the development of the usual numbers of cysticercoids from a test infection given soon after narcosis. If, however, the intoxicated mice were placed in an incubator so as to maintain normal body temperature, similar numbers of cysticercoids developed as in controls not receiving alcohol.—T. E. GIBSON.

FUEST. (1942.) Trichinenfund im Hauptschlachthof Köln. **[Trichinosis at the main abattoir, Cologne.]**—*Z. Fleisch- u. Milchhyg.* **53.** 49. **1568**

For the first time in 38 years, larval trichinae in pigs' carcasses which had been obtained locally were found at the abattoir. Trichinae had recently been found in three foxes caught in the district.—R. A. ROPER.

*NEGHME, R. A. (1944.) Epidemiologia de la triquinosis. **[Epidemiology of trichinosis.]**—*Biologica, Santiago.* **1.** 127–140. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 7. 69, copied *verbatim*. Signed: GINA CASTELNUOVO.] **1569**

Frequence of trichinosis in rats, hogs, and men in Chile is here reported. Of 294 cadavers examined, 12·5% were infested. Bachman's intradermic reaction was positive in 5 out of 96 healthy individuals tested.

CUCKLER, A. C., & ALICATA, J. E. (1944.) **The life history of *Subulura brumpti*, a cecal nematode of poultry in Hawaii.**—*Trans. Amer. micr. Soc.* **63.** 345–357. **1570**

The authors have been able to complete the life-cycle of *S. brumpti* under laboratory conditions. The following insects have been experimentally infected with larvae: the beetles *Tribolium castaneum* and *Alphitobius diaperinus*, the grasshoppers *Conocephalus saltator* and *Oxya chinensis*, in addition to those previously reported by ALICATA [*V. B.* **10.** 34]. A number of insects, including the housefly *Musca domestica*, were resistant

to experimental infection and were not found to be infected naturally.

The eggs are embryonated when passed in the faeces and hatch in 4–5 hours after ingestion by a suitable insect. The larvae penetrate the gut wall and further development takes place in the body cavity of the arthropod. In 4–5 days a moult occurs. The second-stage larva becomes encapsulated by the seventh or eighth day and on the 14th to 15th day a second moult occurs giving rise to the third-stage larva which contracts and coils up in the cyst. When third-stage larvae are fed to chicks the larvae soon reach the caecum where development proceeds, two more moults taking place before the adult stage is reached. The first eggs are laid about six weeks after infection.

Descriptions are given of the adult worms and of the various larval stages. The authors discuss the taxonomic position of the genus *Subulura* and conclude that it represents a form intermediate between the Oxyuroidea and the Spiruroidea.—T. E. Gibson.

See also absts. **1655**, **1656** (anthelmintics), **1668** (acid-ether centrifugation technique), **1669**, **1670** (mounting medium).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

Mansfield, M. E. (1945.) **Lymphocytoma in a 15-month-old Dalmation bitch.** — *Vet. Med.* **40.** 282. **1571**

M. describes a neoplasm involving the portal, lumbar, mesenteric and ileo-colic lymph nodes and adjacent portions of the intestine in a 15-month-old Dalmatian bitch. The mass was diagnosed as a lymphocytoma and was thought to have arisen in the portal lymph node.—E. G. White.

Pullinger, B. D. (1945.) **An experimental approach to the problem of trauma and tumours.**—*J. Path. Bact.* **57.** 467–476. [Author's summary copied *verbatim.*] **1572**

Simple trauma in the form of a single excision of skin combined with the previous application of a carcinogenic chemical increased the risk to the individual animal of developing a tumour by less than 1 per cent. when the carcinogenic stimulus was slight and by 13 per cent. when it was by itself a very strong one.

Waters, N. F. (1945.) **Natural transmission of avian-lymphomatosis.**—*Poult. Sci.* **24.** 226–233. **1573**

This paper presents further evidence supporting the views of previous workers that lymphomatosis may be transmitted under natural conditions both through the egg and by contact. In 1939 the foundation stocks of the Regional Poultry Research Laboratory were obtained as hatching eggs from nine different flocks. The chicks obtained were housed in newly constructed buildings and confined throughout their lives under rigid quarantine regulations. In the following years the houses and equipment were thoroughly cleaned and fumigated before brooding commenced.

Despite the sanitary and quarantine precautions lymphomatosis appeared in 1939, 40 days after the first chicks were hatched. The mortality from lymphomatosis in the 1939 population reached 21·9% in 600 days. Similar results were obtained with the chickens reared in the four subsequent populations, 1940–43.

Since apart from coccidiosis the quarantine measures were successful in preventing the introduction of any other infectious disease a strong case is made incriminating the hatching egg as a vehicle of transmission. Further evidence was obtained in experiments involving the incubation and rearing of individual families of chickens each under conditions of isolation. Some of these families showed cases of lymphomatosis whilst others remained free up to at least 700 days of age. These results were taken to mean that in some instances lymphomatosis was transmitted from parent to offspring by way of the egg.

The evidence for contact transmission was conclusive. The results of three separate trials showed that chickens hatched and reared with infected birds developed a high incidence of lymphomatosis whereas their sibs hatched and reared in isolation remained free.

Some evidence was obtained on the resistance to lymphomatosis which develops with age. Four families hatched and reared in isolation for 300 days were exposed to infection in a mixed infected flock for a further 400 days, without any deaths from the disease resulting, whereas when sibs from these four families were exposed to infection from hatching to 600 days of age, a high mortality from lymphomatosis resulted.—F. D. Asplin.

See also absts. **1566** (spindle-cell sarcoma in hares).

DISEASES, GENERAL

Pomeroy, B. S. (1945.) **Infectious diseases of turkeys.** —*Iowa Vet.* **16.** No. 5. 7–10 & 36. **1574**

In this address to the Iowa Veterinary Medical Association P. outlined briefly the development of the turkey industry in the U.S.A. during the last 25 years, and at the same time emphasized the magnitude of the annual loss caused by disease. During the 1944 season, 75% of the groups of poults examined in the diagnostic laboratory at the University of Minnesota were found to be infected with pullorum disease, typhoid, paratyphoid or paracolon infections. The other conditions dealt with during the address, and to which losses were attributed, were ascites, hexamitiasis, trichomoniasis, dietary deficiencies and mismanagement.—J. D. B.

•Oppermann, T. (1940.) Die Fohlenlähme und ihre Bekämpfung. [**Joint-ill in foals and its control.**] pp. 50. Hanover: M. & H. Schaper. 2nd Edit. RM. 1.60. [Abst. from review in *Berl. Münch. tierärztl. Wschr.* June 7th. 273. (1940).] **1575**

According to the review there were few alterations in this edition as only 18 months had elapsed since the first edition [see *V. B.* **9.** 129].—R. A. Roper.

Pires, A. (1945.) Contribución al estudio de las fistulas adquiridas, a lesión piógena profunda, en los equinos. [**Fistulae with a deep lesion in horses.**]—*Gac. vet., B. Aires.* **7.** 72–101. **1576**

P. discusses 59 cases of fistulae complicated by deep pyogenic lesions in horses upon which operations were performed.

Fistulae are classified as due to bone necrosis, bone sequestra and foreign agents, such as hooks, silk, catgut, etc. In some cases purulent matter collects, and in other cases there is sclerosis of the fistula duct. Of those due to bone necrosis there were 26 cases, composed of fistulous withers, "poll evil", "quittor" and dental necrosis.

There were 16 cases of fistula caused by bone sequestrae resulting from fractures of the tuber coxae,

jaw, sternum, femur, tibia, ischium, premaxilla and 1st premolar. The foreign agents causing fistulae included handles of car doors, pieces of wood and a bullet. Twelve cases which were operated upon are described. The five cases described of purulent fistulae resulted from bleeding as a therapeutic measure. Operation was performed on one case of fistula with sclerosis of the duct.

In dealing with dental fistulae, P. describes the technique of tooth extraction. The methods of regional anaesthesia are explained with suitable diagrams.

P. suggests that in dealing with fistulae it is necessary to suppress the cause, to help tissue repair and to prevent infection.—H. G. ARAMBURU.

PUISSEGUR, J. A. (1943.) La causa provocadora de algunas manqueras. Contribucion al estudio etiologico de ciertas claudicaciones, tendinitis, omoarthritis, etc. La influencia capital del emparejamiento del pie su extraordinaria importancia en el doble aspecto del tratamiento y de la curación. **[The cause of some forms of lameness, tendinitis, etc.]**—*1er Congr. Méd. vet. Prov. B. Aires, 1943.* pp. 441–447. **1577**

P. emphasizes the necessity for careful levelling of the hoof in dealing with all kinds of lamenesses. Without this, treatment is unlikely to be successful.

—H. G. ARAMBURU.

CASSAMAGNAGHI, A., & CASSAMAGNAGHI, A. (hijo). (1945.) La vaginitis granulosa o enfermedad nodular de los bovines. Su reconocimiento en el ganado del Uruguay. **[Bovine granular vaginitis.]**—*Bol. mens. Direcc. Ganad., Montevideo.* **28.** 220–228. **1578**

The authors report what they describe as the first case in Uruguay of bovine granular vaginitis.

A brief review of the disease is given, but the proof of isolation of the causal organism (*Streptococcus vaginalis bovis*) is not clear and no protocols are given.

—H. G. ARAMBURU.

*GELDMACHER, W. (1942.) Untersuchungen über Haematuria vesicalis bovis. (Fütterungsversuche mit Farnkrautpulver.) **[Bovine chronic haematuria. Feeding experiments with bracken.]**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 472.] **1578**

In an effort to determine the cause of bovine chronic haematuria, *Pteris aquilina* (bracken), which is frequently found in haematuria districts, was fed to three animals at the rate of 16·76 kg. of dried powdered material for a period of three months. No symptoms of bovine chronic haematuria were produced, nor was there any deterioration in general health. During the three months of the experiment, the animals gained on an average 30 kg. each. G. discusses whether the prolonged drying and heating of the material may have destroyed its harmful properties.—R. MORGANSTERN.

MAAS, A. (1944.) Zur Feststellung der Ursache des sogen. Herztodes des Schweines. **[Aetiology of sudden fatal syncope in pigs.]**—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **52/50.** 144–149. **1579**

Sudden fatal syncope in pigs was found to occur in adjacent districts and within these on neighbouring farms. Symptoms and pathological changes are described, alterations of the heart muscle being characteristic. A variety of factors (poisons, heredity, feeding, housing) were found to have no causal connexion with the disease. Oral and parenteral administration of suspensions of organs from diseased animals or transfer of dung from infected to healthy sties did not spread the disease. When healthy animals were introduced into infected herds, they frequently became infected. Death occurred in the majority of cases 20–30 days after contact. When pigs from diseased herds were brought into a healthy herd the results were not so clear-cut; only one pig out of 42 became ill: possibly the diseased animals were in a non-infective stage. M. concludes that the disease is spread through direct or indirect contact, *i.e.*, by a carrier, and is caused by a live agent.—R. MORGANSTERN.

BUZENAC, M. (1944.) Constitution des corpuscules hématiques. [**" Haematic corpuscles " within the red blood cells of cats with " infectious coryza ".**]—*Bull. Acad. vét. Fr.* **17.** 306–311. **1580**

The authors describe bodies observed in the red blood corpuscles of cats and dogs in certain infections. A study was carried out on the blood of a cat with infectious coryza. The bodies were irregularly spherical, usually close to the corpuscle wall, and capable of movement of a Brownian character. They are 1·5–3·0 μ in diameter and when released from the blood cells by lysis with water appear as colourless bodies with refractive spots. They are insoluble in fat solvents, dilute sulphuric acid, nitric acid, caustic soda and potassium carbonate. Stained with carbol fuchsin, brilliantly stained granules are seen, disposed round the edges and varying in size from 1·0 μ to the least measurement visible. The authors suggest that these " haematic corpuscles " are some infectious agent not noted before in these conditions. These bodies were not found in healthy animals nor in animals with other diseases.

—R. M. LOOSMORE.

BING, J., & CHRISTENSEN, N. O. (1944.) **The connection between plasma cells and the occurrence of hyperglobulinemia in horses and cattle.**—*Acta med. scand.* **116.** 382–394. [In English.] **1581**

Blood samples were taken from all the horses and cattle entering the Royal Veterinary and Agricultural College in Copenhagen; the formol-gel test was applied to the serum and the reaction was read during the first three hours, the samples being kept at room temperature. A protein determination was performed on samples with a positive reaction and also on some samples where a positive reaction was obtained in a little more than the three hours. The amount of protein present was compared with the clinical picture and the pathological findings in those cases in which examination was made P.M.

Of 237 samples from 225 horses 19 gave a positive result (two of these 19 being duplicates), the percentage of positive reactors being 7·55. 62 samples from 49 cows were tested, 30 being positive, but ten of these were duplicates. The percentage of positive reactors in cows was 40·8. In all cases where there was a positive reaction, hyperglobulinaemia was observed, the globulin values ranging from 3·9 to 6·5%.

Strangles induces hyperglobulinaemia in horses more than any other condition and the inflammatory tissue from such cases was found to be very rich in plasma cells. In a case of gangrenous pneumonia, plasma cell infiltrations of the lymph nodes was seen at autopsy. Hyperglobulinaemia was observed in the following conditions in horses: pleuro-pneumonia, broncho-pneumonia, rhinopharyngitis, endocarditis, and strongylosis with worm aneurysm.

In cattle hyperglobulinaemia occurred chiefly in cases of TB. In these cases, the tubercles on microscopic examination revealed giant cells, and epithelioid cells surrounded by round cells, which in part proved to be plasma cells. Hyperglobulinaemia was also found in non-tuberculous broncho-pneumonia and in cases where examination was made P.M. accumulations of plasma cells were found in the lungs and lymphatics. Large accumulations of plasma cells were found in the kidney and renal hilus lymph nodes of a cow with pyelonephritis and showing hyperglobulinaemia. Hyper-

globulinaemia was seen in cases of chronic mastitis and pericarditis but in these cases no histological examination was made.

In all cases where microscopic examination of hyperglobulinaemic animals was made, plasma cell accumulations were seen, except in one case where examination of an abscess revealed no plasma cell accumulation but reticulo-endothelial cells staining with pyronin were seen. The authors state that the investigations support the theory that the pathologically increased serum globulins are formed by the plasma cells and other reticulo-endothelial cells.—T. E. GIBSON.

AKERBLOM, E., & SJÖBERG, K. (1938.) Das Blutbild beim Pferde nach langdauernder Histaminapplikation. **[The effect of long-continued histamine injection on the blood picture of the horse.]**—*Arch. exp. Path. Pharmakol.* **189.** 53–63. Reprinted in *Medd. Vet.-Høgsk. Stockh.* **12.** (1937–38.) **1582**

Intravenous injection of histamine in five horses (2–4 injections daily, or continuous infusion) was followed in the case of two animals by oedema of the foot, which was particularly marked around the coronet. Two animals were slightly lame in the forefeet on the day after the injections. These findings tend to confirm the authors' suggestion that histamine may be concerned in the aetiology of laminitis. Changes in the blood included neutrophile leucocytosis, eosinophile leucopenia, increased sedimentation rate, a fall in serum P and a rise in serum phosphatase.—E. G. WHITE.

HOYLE, L., & ORR, J. W. (1945.) **The histogenesis of experimental pneumonia in mice.**—*J. Path. Bact.* **57.** 441–449. [Authors' summary copied *verbatim.*] **1583**

After intranasal administration of bacteria to anaesthetised mice, the earliest changes are found in scattered groups of alveoli, which show collapse and leucocytic infiltration. This occurs even with bacteria of low virulence. With virulent organisms, subsequent extension of pneumonia may take place either by centrifugal spread from the primary foci of collapse inflammation, or by extension along the vascular adventitia followed by widespread invasion therefrom of the alveoli. The latter method appears to be the mechanism of production of lobar consolidation. There is no convincing evidence of the spread of infection up and down the bronchial lumina after the primary phase. In the most severe infections inflammation spreads from the hilum. Changes in the bronchial epithelium are late, as opposed to influenza virus A infections, where they are primary and characteristic in type.

See also absts. **1657** (respiratory diseases of horses), **1658**, **1659** (shock), **1680** (livestock diseases in British Honduras), **1681** (in Gold Coast Colony), **1682** (in Nigeria), **1683** (in Cyprus), **1684** (nervous diseases of cattle), **1685** (avian pathology).

NUTRITIONAL AND METABOLIC DISORDERS

KRUPSKI, A., ALMASY, F., & ULRICH, H. (1942.) Kommt es bei reiner Milchfütterung zu einem Milchnährschaden beim Kalb? **[Do calves on a diet confined to milk acquire deficiency disease?]**—*Schweiz. Arch. Tierheilk.* **84.** 466–474. **1584**

Two healthy calves were kept on a diet consisting exclusively of milk. Both developed a typical hypochromic anaemia progressing in severity until the animals were 109 and 118 days old respectively, when the experiment was concluded because the animals developed acute diarrhoea. Pica occurred simultaneously with the anaemia. It diminished with the improvement in the anaemic condition which took place when a mixed diet was fed. During the period of anaemia no alteration in the blood picture was observed. The number of reticulocytes was not increased at any time and the acid-base equilibrium was not disturbed. The cause of the observed anaemia and pica was thought to be the iron deficiency following the exclusive milk diet.—R. MORGANSTERN.

•HAMILTON, J. W. (1943.) **Nutritional requirements of rabbits, guinea pigs and hamsters.**—*Thesis, Michigan.* pp. 129. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 4. 7, slightly amended.] **1585**

On a simplified diet containing dextrin 30, casein 20, cellulose 15, lard 11, salts 4, brewer's yeast 15 and corn starch 5 parts per cent., fortified with vitamins A, D and E (also C for guinea pigs) rabbits and guinea pigs grew normally but the diet was not adequate for reproduction. Every young guinea pig and most of the young rabbits had generalized extensive haemorrhages. When 0·005% of 2-methyl-1,4-naphthoquinone was included in the diet the weaning percentage was reasonably good and the incidence of haemorrhages was negligible. Neither soybean nor wheat germ oil is a reliable source of vitamin K. A phytol concentrate and pure phytol increased the weaning percentage and reduced the incidence of haemorrhage. Dried yeast contains all the water-soluble vitamins required by these spp. for growth and reproduction. Extraneous material is precipitated by adding alcohol to a conc. of 50%. Guinea pigs grow at a normal rate if 2% of the 50% alcohol-soluble material is included in their diets. An aqueous extract of liver is also an excellent source of the unrecognized vitamins required by these animals. Hamsters grow normally on a ration of casein 20%, glucose 65%, lard 8%, cellulose 3% and salts 4%, supplemented with vitamins A, D, E, K, thiamine, riboflavin, pyridoxine and pantothenic acid; if nicotinic acid, choline and inositol are added, this ration is adequate for reproduction. If inositol is omitted the ♀♀ bear deformed, decomposed and haemorrhagic embryos. If nicotinic acid or choline, or both, are omitted the weaning percentage is reduced. On a vitamin E-deficient ration they grow slowly, the deficiency becomes acute in 4–16 weeks and they collapse suddenly and die. Administration of α-tocopherol shortly after collapse may produce spectacular recovery. On a vitamin K-deficient diet hamsters continued to grow for 4–6 weeks, remain stationary or decline in weight for 2–3 weeks, and then resume growth and attain normal mature weights. Examination disclosed haemorrhagic areas during the period of arrested growth. If vitamins E and K are omitted they grow slowly, collapse and die after 5–7 weeks and are severely haemorrhagic. Three generations have been reared on simplified diets which contain none but the recognized vitamins.

BLACK, W. H., TASH, L. H., JONES, J. M., & KLEBERG, R. J., Jr. (1943.) **Effects of phosphorus supplements on cattle grazing on range deficient in this mineral.**—*Tech. Bull. U.S. Dep. Agric.* No. 856. pp. 23. **1586**

In the flat coastal plain of Texas bordering on the Gulf of Mexico many of the cattle are undersized, show impaired capacity for reproduction and manifest a depraved appetite and other symptoms of aphosphorosis. The authors studied the effects of P supplements upon beef production and reproduction. Analyses show that few samples of the vegetation contained more than 0·13% P but the Ca status was better, at 0·23% or more.

Controlled experiments were carried out with crossbred cattle on range to show the value of P supplements

fed as disodium phosphate or bone meal, and bone meal with iron and trace elements. Associated blood estimations were made for inorganic P and haemoglobin. Except at the beginning and end of the experiment the live weights of the mineral-supplemented cows were significantly higher than the controls; the diminished capacity of the controls for reproduction without the ensuing loss of condition associated with pregnancy and lactation may account for the comparatively high weights of the controls at the end of the experiment. The main effect of P supplements was shown in the significantly higher percentages of calf crops and the greater weights attained by the offspring. These supplements had little effect on the birth weights of the calves, but over a two-year period the average weaning weights of the calves in the supplement-fed groups was 69 lb. more than in the controls and careful costings showed a decided economic advantage in favour of supplements. There were no significant differences in the weaning weights of the calves between the various supplement-fed groups.

Aphosphorosis was diagnosed by blood analysis long before clinical symptoms became evident, the inorganic P values of the blood usually being less than 4 mg. %. Nearly all control animals showed signs of osteophagia during the experiment. There were no significant differences in the Hb values between controls and supplement-fed groups nor between these and the groups receiving trace elements as well. The feeding in supplements of 6·5 g. P for six days per week (Sundays excepted) from January, 1938, to March, 1941, prevented aphosphorosis and corrected existing P deficiencies if not too advanced. Lactating cows receiving 14·3 g. P daily showed higher blood P values than those receiving 6·5 g. Bone meal and disodium phosphate were of equal value as P supplements to the existing P-deficient vegetation.—A. EDEN.

REYNOLDS, D. S., HILL, W. L., & JACOB, K. D. (1944.) **Dilute hydrochloric acid as a solvent for phosphates with special reference to defluorinated phosphates and other materials used as phosphorus supplements for livestock.**—*J. Ass. off. agric. Chem., Wash.* **27.** 559–571. **1587**

The shortage of phosphorus for feeding purposes has led to the removal of fluorine from such substances as superphosphate and commercial phosphate rock in order that they may be used as a source of P. There is no standard procedure by means of which the P assimilation of these substituted materials may be quickly compared with each other or with bone meal. Extraction has been made of the defluorinated phosphates with dilute HCl, within the ranges of concentrations found in the stomachs of animals. The present paper investigates the factors involved in the extraction of phosphates with dilute HCl, with special reference to phosphates defluorinated by heat. When superphosphate is heated at 600°–800°C., F is removed and crystalline calcium metaphosphate or pyrophosphate or tricalcium phosphate or possibly all three are formed. Commercial phosphate rock is heated at 1400°C. to expel F.

Samples of these products when tested with dilute HCl (0·4%) to compare solubility, gave the following results:—calcium metaphosphate about 1%, pyrophosphates 21–51%, tricalcium phosphates and hydroxylapatite 77–78%. Seven tables and two graphs are given summarizing detailed experimental results.

The behaviour of defluorinated phosphates towards dilute HCl, without parallel studies in nutrition, is inadequate as a means of defining the P availability.

The concentration of HCl used is well within the range of concentrations (0·1–0·55%), of this acid found in the stomachs of different animals; and a phosphate which is only slightly attacked by 0·4% HCl, *e.g.*, crystalline calcium metaphosphate could scarcely be expected to give favourable feeding test results. But there is no evidence of assimilation of P ingested in the form of water-soluble sodium metaphosphate.

In rats fed three different defluorinated superphosphates, the availability of P results were in the same order as the "solubility" data of these materials.

Other studies on rats fed defluorinated phosphate rock, crude vitreous calcium metaphosphate and pure vitreous calcium metaphosphate respectively gave results 96, 73, 49 relative to sodium orthophosphate as 100. In comparison the "solubility" data for very similar samples gave 80, 55 and 25, referred to steamed bone meal as the standard. A list of 23 references is given.—E. M. J.

SKYDSGAARD, H. (1944.) Meddelelser fra Praksis I. Puerperal Haemoglobinuri. [**Reports from practice. I. Puerperal haemoglobinuria.**]—*Maanedsskr. Dyrlaeger.* **56.** 568–576. **1588**

Puerperal haemoglobinuria in cows is a disease of nutritional origin which occurs within four weeks of calving in localities poor in natural sources of phosphorus; lack of calcium (*e.g.*, loss of calcium in the milk) also appears to contribute. S. observed 33 cases from 1932–44 of which there were 11 single cases on separate farms, ten as two each on five farms, six as three each on two farms and six on one farm, the latter occurring during the recent war and being probably due to foodstuff shortage. Two case records are given.

Symptoms included subnormal temperature, frequent small pulse, normal respiration, laboured heart action, venous pulse, pale dirty-looking mucosae, red to brown urine, scanty defaecation or slight diarrhoea with straining, and little or no appetite. The haemoglobinuria is often overlooked at first, especially in dark byres so that aid is sometimes called at too late a stage for recovery to be possible. Nine died out of the 33 animals observed.

Treatment comprised air infusion of the udder, blood transfusions of 2–3 litres twice daily, heart tonics, 250 g. glucose twice daily, 100 g. each of ferrous sulphate and chalk two or three times daily, and in severe cases 5 litres of saline injected subcutaneously. Sodium phosphate is given during recovery. Blood transfusion in cattle is not without risk of reaction from incompatibility.—J. E.

ALLCROFT, R. (1945.) **Vitamins in animal health. (Part I.)**—*Vet. J.* **101.** 215–232. **1589**

ALLCROFT, R. (1945.) **Vitamins in animal health. Part II.**—*Ibid.* 263–279. **1590**

I. This general article reviews the role of vitamins A, D, E and K in animal health and discusses pathological conditions associated with deficiencies of these vitamins. Consideration is also given to the present knowledge of the requirements of different species for the fat-soluble vitamins.

II. The second part of this review is mainly concerned with the factors of the vitamin B complex, including vitamin B_1 or thiamine, vitamin B_2 or riboflavin, nicotinic acid, vitamin B_6 or pyridoxine, pantothenic acid, biotin, folic acid, *p*-aminobenzoic acid and certain other substances related in physiological function to the vitamin B complex. The functions of vitamin C and vitamin P in animal health are briefly discussed.

—A. M. COPPING.

*HEITMAN, H., Jr. (1943.) **Vitamin deficiencies in rations of natural foodstuffs.**—*Thesis, Missouri.* pp. 81. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 4. 7, slightly amended.] **1591**

Approximately 40% of the pigs born alive in the Corn Belt die before they are old enough to wean, even when the rations of the mothers are adequate according to current feeding standards. As shown heretofore, these standards are faulty; most of the mortalities are due to nutritional deficiencies, the most important probably being of one or more unrecognized vitamins. These deficiencies were studied with the rat. ♀ rats on a commonly used swine ration supplemented with casein grew at about 80% normal rate, but eventually attained normal mature weights. Paired feeding trials with weanling rats showed that some combination of thiamine, riboflavin, pyridoxine and pantothenic acid increased the growth rate to normal and was as effective as a supplement of all 14 known vitamins. None of the four was effective alone.

The basal ration with added casein supported normal reproduction through parturition; the young were normal at birth but only 16·5–63% were weaned at 28 days of age, and the weaning weights were subnormal. The only characteristic symptom was a lethargic condition preceding death. Moderately fatty livers (prevented by choline) were found at autopsy, and a few cases of haemorrhage. No acetone bodies were detected in the urine, there was no anaemia, and whole blood clotting time and the prothrombin time seemed normal. Addition of choline to the basal ration increased the weaning percentage, but the addition of thiamine, riboflavin, pyridoxine, and pantothenic acid, with or without choline, increased the rate of growth of the litters to normal. Addition of all other known vitamins had no further effect. Supplements of dried liver or of aqueous or alcoholic extracts increased the survival rate to normal and sustained normal growth; the accelerated growth rate is attributed to the four vitamins mentioned, the effect on litter survival to the presence of an unrecognized factor which is adsorbed on fuller's earth at a pH of 1 [?7]. A folic acid concentrate was an excellent source and folic acid may be related to it or identical with it. Differences in the nature of the deficiencies before and after weaning may be related to symbiotic microbial synthesis in the alimentary canal.

Ender, F., & Helgebostad, A. (1945.) Om påvisning av en vitamin B_1-destruerende faktor i prøver av sild og brisling. Antivitaminer som årsak til beriberi hos rev. [**Demonstration of a vitamin B_1-destroying factor in herrings and sprats. Antivitamins as cause of beri-beri in foxes.**]—*Norsk VetTidsskr.* **57.** 32–76. [Abst. from English summary.] **1592**

In tests on rats it was found that substances which inactivate vitamin B_1 are present in different kinds of fish, either fresh or frozen, and from either fresh or salt water. Feeding such kinds of fish to foxes, even in combination with foodstuffs abundant in vitamin B_1 gave results similar to those of the rat tests. The destructive active principle in the fish specimens may show some analogy with the vitamin B_1-splitting enzyme known to occur in carp.

The authors suggest that frequent outbreaks of beri-beri on fox farms where large quantities of raw herrings and sprats are fed, may be due to a destruction of the dietary vitamin B_1 caused by an antivitamin. Comparisons are drawn between this destroying factor and other antivitamins such as avidin, the toxic element in egg-white. The therapeutic effect of the sulphonamides is said to be due to inhibition of the metabolic processes of bacteria. Bacteria need biotin for growth, and the effective sulphonamide inactivates a bacterial enzyme complex in which biotin acts as a coenzyme. The action is antivitamin in character.

See also absts. **1519** (biotin), **1622** (phosphate supplements for sheep), **1649** (*p*-aminobenzoic acid).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

Barcroft, J. (1945.) **The preparation and biological effects of iodinated proteins. I. Introduction.**—*J. Endocrinol.* **4.** 219–220. **1593**

A brief introductory note outlining the course of events from the first experiments in 1931 in Canada on the feeding of dried thyroid gland to milch cows, until the experiments carried out in 1942 with iodinated casein.—M. C.

Rivers, R. P., & Randall, S. S. (1945.) **The preparation and biological effects of iodinated proteins. 2. Preparation and properties of physiologically active iodinated proteins.**—*J. Endocrinol.* **4.** 221–236. [For part 1, see abst. preceding.] **1594**

In the preparation of iodinated proteins the acid-insoluble iodine content and the ratio of acid-insoluble to total iodine were taken as indices of biological activity. Preliminary laboratory-scale experiments with ox plasma, ardein (commercial arachin) and casein gave relatively high acid-insoluble iodine figures which decreased with increasing scale of manufacture.

Ardein was first used as a substitute for the less readily available casein, but was later abandoned owing to variability of batches, and unpalatability and toxicity of the finished product. An attempt to concentrate the active principle by alkaline hydrolysis gave a product which contained 2·7% of acid-insoluble iodine, but was inactive and unpalatable when fed to cows. Attempts to remove the inorganic iodine by dialysis and precipitation or to increase the acid-insoluble iodine did not improve the value of the product.

Iodination of oxalated ox plasma gave proteins containing 0·1–0·7% of acid-insoluble iodine, active on tadpoles but without effect on the milk yield of cows.

Casein was the most satisfactory of the three proteins for large-scale manufacture, giving better yields of high acid-insoluble iodine and products of greater biological activity. Incubating the casein for 24 hours at 65°–70°C. during iodination appeared to increase the acid-insoluble iodine content.—A. L. G.

Blaxter, K. L. (1945.) **The preparation and biological effects of iodinated proteins. 3. The effect of iodinated protein feeding on the lactating cow. (i) The effects of preparations of low activity and of iodinated ardein. 4. The effect of iodinated protein feeding on the lactating cow. (ii) The effects of iodinated casein.**—*J. Endocrinol.* **4.** 237–265 & 266–299. [For part 2, see abst. preceding.] **1595**

Robertson, J. D. (1945.) **The preparation and biological effects of iodinated proteins. 5. The effect on basal metabolism of milk from cows fed with iodinated protein.**—*Ibid.* 300–304. **1596**

3. (i) Numerous carefully conducted experiments were commenced in 1941 to determine whether under normal farm conditions milk production could be stimulated by iodinated proteins without harming the health of the cow. In the first three experiments involving over 150 cows the effects of feeding various doses of iodinated ox blood, iodinated ardein and iodinated casein were studied; control groups of cows were fed potassium iodide or pure proteins, or were given

injections of Na-thyroxin. Several of the iodinated preparations had negligible galactopoietic activity; others, however, increased the daily milk yield by 15–19%. To obtain complete consumption of the large daily dose it was generally necessary to resort to forcible administration. Potassium iodide had no effect on milk production, but, like some of the iodinated proteins, caused severe iodism. The minimum daily intake of iodine which caused symptoms of poisoning was 3·7 g.

Further chemical research resulted in the preparation of a fourth batch (N_4MB) of iodinated ardein which had a higher percentage of acid-insoluble ("thyroxin") iodine than any previous preparation. This preparation in doses of 10 and 50 g. per day was fed to eight of 12 cows in mid- to late lactation for a period of three weeks interpolated between two control periods, the whole experiment lasting nine weeks. Palatability was moderately satisfactory. On the 50 g. dose level, the mean response per cow during the treatment period was 108·5 lb. of milk above that of the control cows, *i.e.*, there was a percentage response of 23; the fat percentage of the milk at the third week of treatment showed a percentage response of 8·5, and the fat yield a percentage response of 39. Heart and respiratory rates were recorded twice daily; by the 20th day the heart rate reached a maximum increase of 43·5% and by the 12th day the respiratory rate reached a maximum increase of 42·7%. When the environmental temperature was high the response in respiratory rate of treated cows was accentuated, indicating a difficulty in heat disposal to be kept in mind if iodinated proteins are used during the summer months. The rectal temperatures were recorded twice daily; the temperatures of the cows on the 50 g. dose showed a slight but not significant rise. During the treatment the mean body weight loss per cow was 85 lb.; on the cessation of treatment about half this loss was regained within ten days, the gain thereafter being much less rapid. Blood analyses showed nothing abnormal except for high blood sugar values. Iodism did not occur. The 10 g. dose of N_4MB produced little response.

In a further experiment lasting 12 weeks, two of four cows received 50 g. of N_4MB per day for seven weeks. The milk yield of the treated cows increased to a maximum in the third week when the daily yield was 6·2 lb. more than that of the controls. The yield then declined, though it was still higher than that of the controls when the treatment was stopped. During the following fortnight it dropped precipitously below the yield of the control cows. The butter-fat followed a similar cycle of changes. It is concluded that there is not sufficient evidence to suggest a diminution of response as a result of prolonged treatment. Maximum heart and respiration rates were reached in the third week of treatment. One cow developed temporary cardiac arrhythmia during the third and fourth weeks of treatment. Throughout the treatment period both cows showed increased nervous irritability. Blood analyses revealed no significant departure from normal. By the end of the seventh week both cows had lost over 110 lb. in weight and were in poor condition.

The subsequent history of the cows which received the high doses of N_4MB showed that the animals behaved normally and that their milk yields in the subsequent lactations were not impaired.

4. (ii) In the first experiment with iodinated casein having a high content of acid-insoluble ("thyroxin") iodine, four cows in late lactation and four first-calf heifers were used to test the potency of three preparations. The three-week period of treatment was interpolated between two control periods, the experiment lasting seven and a half weeks in all. The animals were at grass during the experiment but received supplements of concentrated foods to which 30 g. per day of the iodinated proteins were added. One preparation was inactive, the others gave good responses. The galactopoietic effect was obtained in the heifers, but not in the cows, though these showed increases in heart and respiratory rates. It was concluded that increasing the metabolism of cows which are in late lactation, and have involuting mammary glands, results in no increase of milk secretion. Thus lactation cannot be prolonged by giving iodinated proteins.

The most potent iodinated casein preparation was then fed in doses of 30 g. per day to groups of cows at pasture and to groups kept indoors on winter rations. The feeding value of the pasture fell rapidly and the total metabolism and milk production were better maintained on the winter rations. Approximately equal responses were obtained on these widely different rations. "Coating" the iodinated casein with stearic acid had no effect on its potency. The initial level of production appeared to be the main factor in determining the magnitude of the response. The higher the initial yield the greater was the absolute response per day, but the lower was the percentage response. The stage of lactation appeared to be the main factor causing initial yield variations. There was some evidence that the butter-fat secretion behaved similarly. Loss of body weight was not serious and was not related to milk production. Severe iodism was not observed. The most accurate estimates of the effect of the treatment were those related to increase of milk production and heart rate, the least accurate related to increase in body temperature. The above findings were confirmed by experiments on one heifer fed 30 g. of iodinated casein per day during different stages of her first lactation. During the first period of treatment the increases in yield per day were 8·2 lb. or 43%; in the second period 5·4 lb. or 66%. The heifer lost considerably in weight and failed to regain much of it before calving five weeks after the end of the experiment. The subsequent lactation was normal and the calf was normal in weight; nevertheless it is concluded that stimulation of metabolism during the late stages of pregnancy is undesirable.

An experiment lasting seven weeks, with a treatment period of two weeks was conducted on six cows in mid- to late lactation to investigate whether a daily dose of 15 g. of iodinated casein would increase milk yields with less effect on general metabolism. At this level the milk yield was not increased but the normal decline in lactation did not take place; there was a net response of 3·04 lb. per day or 16·7%. The results suggested that a dose giving a response in the region of 20% might be the optimal stimulation.

"Cattle cubes" were produced which when fed at the rate of 4 lb. daily provided 20 g. of iodinated casein as well as the nutrients required for the additional milk. They were moderately palatable. An experiment with 36 cows showed that no loss of potency occurred in manufacture or during five weeks' storage in damp conditions. The mean percentage response in milk production in the second week of treatment was 21·9. The greater the divergence of the yield of the cow immediately prior to treatment, from the yield she was capable of giving during the early part of her lactation, the greater was the response, provided she had not reached the phase of rapid terminal decline in yield. The loss in body weight was small.

5. R. reviews the literature concerning the thyroxin content of milk. To determine whether milk from cows fed with iodinated proteins contained thyroxin in excessive amounts, the basal metabolic rate, pulse rate, and blood pressure were studied in 27

healthy women who drank one quart of the milk daily for one month. No elevation of metabolic rate, heart rate or blood pressure was observed. The significant increase in body weight noted, indicated that the calorific intake greatly outweighed the effects of any metabolic stimulant which might be present in milk. Although the milk did not contain sufficient thyroxin to raise the metabolic rate of adults it is deemed inadvisable to feed such milk to young infants.—A. T. COWIE.

ROWLANDS, I. W. (1945.) **The preparation and biological effects of iodinated proteins. 6. Further experiments on the restoration and maintenance of growth after thyroidectomy.**—*J. Endocrinol.* **4.** 305–311. [For part 5, see abst. preceding.] **1597**

DEANESLY, R., EMMETT, J., & PARKES, A. S. (1945.) **The preparation and biological effects of iodinated proteins. 7. Use of *Rana temporaria* tadpoles for the assay of thyroidal activity.**—*Ibid.* 312–323. **1598**

DEANESLY, R., & PARKES, A. S. (1945.) **The preparation and biological effects of iodinated proteins. 8. Use of *Xenopus* tadpoles for the assay of thyroidal activity.**—*Ibid.* 324–355. **1599**

6. The results are described of implantation of tablets of thyroxin or its sodium salts and of the feeding of desiccated thyroid or iodinated ardein in overcoming the retardation of growth caused by thyroidectomy in young male rats. Thyroidectomized rats are not suitable for use in the biological assay of thyroidal activity.

7. Tadpoles of *Rana temporaria* were used for the assay of thyroidal activity. Practical difficulties, such as the limited season during which they are available, are a drawback to the use of tadpoles of this species.

8. Tadpoles of the African toad *Xenopus laevis* were used in the assay of thyroidal activity of thyroid preparations, iodinated proteins and related substances.

Methods of management of the toads which ensured supply of large numbers of tadpoles for the purpose are described in detail, as are the methods adopted in using the tadpoles for assay.—M. C.

DEANESLY, R., & PARKES, A. S. (1945.) **The preparation and biological effects of iodinated proteins. 9. Biological activity of iodinated proteins.**—*J. Endocrinol.* **4.** 356–370. [For part 8, see abst. preceding.] **1600**

The activity of iodinated proteins was tested by their effect on the rate of metamorphosis of *Xenopus* tadpoles; this paper indicates the extent to which the activity in the *Xenopus* test is correlated with galactopoiesis and shows the difficulty of relating biological activity to iodine analysis.

The materials tested were iodinated plasma proteins, iodinated ardein and iodinated casein. With iodinated casein as reference standard the plasmas and ardeins were shown to range from virtually inactive to highly active, the majority possessing relatively low activity. The best plasma was only about half as active as the casein standard; the iodinated ardeins had a slightly higher average activity than the plasmas. One plasma, three ardein and four casein preparations were tested both on the cow and on tadpoles. There appeared to be a complete correlation between the two forms of biological activity [see 4 above].

There is a general tendency for activity of plasma protein to increase with iodine content, but the variation at any level is too large to be accounted for by errors of biological or chemical assay. There is a similar rough correlation between ardein activity and iodine content. Iodinated ardeins with less than 0·7% of acid-insoluble iodine show very low biological activity. With 0·7–1·24% the activity is equivalent to a commercially dried thyroid powder containing 0·09–0·11% of acid-insoluble iodine. A series of commercial iodinated proteins, the mode of preparation of which is not described, gave irregular results in which the activity did not appear to be related to the iodine content. Nearly all the iodinated caseins had higher acid-insoluble iodine contents than did the plasmas or ardeins. The preparations made by incubation at 70°C. formed a higher activity group than did those which did not have this treatment and showed slow increase of activity with increasing iodine content.

The authors suggest that there are two phases in the activation of casein. The first stage, in increasing the iodine content up to 0·8%, is a phase of rapid increase in activity. The second begins at 0·8% and is a phase of slow increase in biological activity. The activation curve is of a sigmoid nature.

From the phasic nature of the activation curve it appears that variations in activity of batches with similar acid-insoluble iodine content can be accounted for by differences in the iodine distribution between di-iodotyrosine, thyroxin and inactive oxidation products, which would be greatly influenced by the mode of preparation. Over-iodination, for example, produces low activity due to the oxidation of di-iodotyrosine to inactive iodine-containing compounds instead of thyroxin. The authors postulate that acid-insoluble iodine up to 0·2–0·4% combines to form but little thyroxin; 0·4–0·8% produces considerable thyroxin and higher concentrations give a little more but also form inactive substances.—A. L. GREENBAUM.

LEE, D. H. K., ROBINSON, K. W., YEATES, N. T. M., & SCOTT, M. I. R. (1945.) **Poultry husbandry in hot climates—experimental enquiries.**—*Poult. Sci.* **24.** 195–207. **1601**

Experiments were carried out in an air-conditioned room to determine the reaction of fowls to atmospheric conditions of high temperature and high relative humidity. The general results showed that the rectal temperature rises with the air temperature and, to a lesser extent, with the humidity. The respiratory rate rises in fairly close agreement with the rectal temperature with a slight lag. Rather surprisingly, the heart rate does not show any consistent change under hot conditions. In hens from which the feathers have been removed the heart rate is increased at both moderate and high temperatures. The symptoms shown by hens under hot conditions are panting with the wings outstretched followed, when the rectal temperature reaches 113°F., by marked distress, with deep sighing respirations and shaky gait. This is followed by complete collapse, the comb is pale and death follows rapidly if relief is not given. Exposure to heat sends hens into a state of partial moult and laying is reduced.

The critical air temperature appears to be between 85°F. and 90°F. Up to 85°F. the rectal temperature does not rise but as the air temperature reaches about 90°F. the effect on the rectal temperature becomes more and more pronounced. Few hens could withstand exposure to air temperature of 105°F. for seven hours and none were able to withstand 110°F. for that time. [It would be interesting to repeat these tests with fowls of some of the native breeds of India which seem able to resist very high temperatures during the hot weather.] Six different breeds varied in their response to changed atmospheric conditions. In an atmosphere of 105°F. and 25% relative humidity the White Leghorns showed the least rise of rectal temperature and the Brown Leghorns the greatest, with Australorp and Rhode Island Reds intermediate. When the humidity was raised to 75% the order was completely changed. The Brown Leghorns reacted least and the Australorp and

Rhode Island Reds most, with White Leghorns and Black Minorcas intermediate. The factors accounting for the varying adaptability of different breeds are briefly discussed. Colour did not appear to play any part in these experiments, in which radiation was at a minimum. Body form is believed to have an important effect. Size of comb and wattles did not seem to be of importance. [The effect of tightness or looseness of feathering is not mentioned.] Methods of housing and management likely to mitigate the effect of hot atmospheric conditions are suggested.

This article is of value to all concerned with the acclimatization of improved breeds of poultry to tropical climates but the varying susceptibility of poultry of improved breeds to tropical diseases is not discussed. —M. C.

RIECKER, O. (1943.) Tierexperimentelle Untersuchung ueber die Veränderung des Hörvermögens nach Unterdruckwirkung. (Vorläufige Mitteilung.) **[Hearing changes in animals after decompression.]** —*Klin. Wschr.* **22.** 145–148. [Abst. in *Bull. War Med.* **5.** 472–473, copied *verbatim.* Signed: E. D. DALZIEL DICKSON.] **1602**

The author has tried to determine the permanent damage caused to the organ of hearing by decompression. Only the functional results are evaluated in this paper. The morphological findings were to be published later.

Guineapigs were used for the tests, since their exposure to a certain intensity of sound produces a well marked twitching of the pinna (Preyer's reflex). The animals were exposed to a sound field produced by an oscillator, and the lowest intensities producing the reflex were recorded. All animals had repeated hearing tests before decompression was started. Three series of experiments were made.

1. In the first series, the animals were exposed on five or six consecutive days to a decompression corresponding to an altitude of 10,000 m. The ascent and descent were fairly slow, over a period of about 30 minutes. A hearing test was performed immediately after, and then 12 to 15 hours after the decompression each day. The result was a daily decrease of the upper tone perception, which though partly recovering until the beginning of the next session, never reached the previous starting level. Towards the end of the whole experiment, the hearing loss for the upper frequencies became very marked, but the loss for lower tones, from 250 to 8,000 c.p.s., was hardly noticeable. The author thinks that in this experiment the damage to the receptive apparatus was caused primarily by oxygen lack.

2. In the second series, the animals were taken rapidly to an altitude of 13,000 m.; thereafter, they had to be taken down to 8,000 m. until they recovered sufficiently for another ascent to the critical height. This process was repeated four or five times in one hour. The hearing test showed a marked decrease over the whole range, which was more pronounced six to eight hours after the experiment than immediately after it. The recovery for the lower tones was nearly complete after eight to ten days, whereas for the higher frequencies it was much slower. In this series the functional results point to the effect of pressure changes on the middle ear.

3. To eliminate to a great extent the pressure changes transmitted through the middle ear, the third experiment was performed on animals which had been subjected to myringotomy shortly before decompression. The experiment was conducted exactly on the same lines as in the second series. The hearing test after decompression showed a similar result, but the loss over the whole scale was much smaller. These animals could not be followed up for more than three to four days, because the onset of an otitis media made them unsuitable for further observation.

The author concludes that the loss of hearing after decompression results from a combined action of anoxia and of mechanical influences on the middle and inner ear caused by sudden pressure changes.

FARNER, D. S. (1943.) **Biliary amylase in the domestic fowl.**—*Biol. Bull., Wood's Hole.* **84.** 240–243. **1603**

Experiments were conducted to investigate the relative amylolytic activity of the bile and the general occurrence of biliary amylase in the fowl. Methods of obtaining bile and pancreatic juice and of estimating their amylolytic activity are described in detail. The bile contains an amylase which is secreted by the liver, but the enzyme action of bile on starch is small when compared with that of pancreatic juice. The optimum hydrogen-ion concentrations for the amylolytic actions of gall bladder bile, hepatic duct bile and pancreatic bile determined experimentally agreed with the accepted value for pancreatic amylase (pH 7·1). Studies on 50 birds in three age groups indicated that the occurrence of amylase in the bile of the fowl is irregular among younger birds.—E. M. J.

SMITH, J. A. B. (1945.) **Reviews of the progress of dairy science. Section A. Physiology of dairy cattle. I. Reproduction and lactation.**—*J. Dairy Res.* **14.** 195–224. **1604**

This is a detailed review of the literature up to the end of 1943. The following aspects of the physiology of reproduction are covered: fertility of bulls and examination of semen, detection of oestrus in cows, oestrogenic and gonadotropic hormones in the treatment of anoestrus, the pH of the reproductive tract, pregnancy diagnosis and reproductive efficiency.

The section on lactation deals with the following problems:—the hormonal basis of mammary development and milk secretion, the application of hormone therapy for the stimulation of mammary development and lactation in dairy cows, the factors involved in the "let-down" of milk, biochemical aspects of milk secretion, the anatomy of the udder and the influence on the milk yield of climate, frequency of milking and the age of the cow.—ALFRED T. COWIE.

SMITH, V. R., & PETERSEN, W. E. (1945.) **Negative pressure and nursing by calves.**—*J. Dairy Sci.* **28.** 431–433. **1605**

The maximum negative pressures developed by calves sucking cows varied from 9–16 in. Hg and when sucking rubber nipples from 12–18 in. Hg. It is concluded that a calf can develop a negative pressure as great or generally in excess of that required in the milking machine to milk hard-milking cows. By inserting a tube into the calf's mouth to prevent the development of negative pressure without interfering with the action of the jaws, it was demonstrated that the calf was unable to obtain milk either from the rubber nipple or from the cow. It was therefore presumed that the calf cannot obtain milk from the teat by the compressing action of the jaws but only by suction, which is produced by wrapping the tongue about the teat when compressed against the upper jaw, and enlarging the oral cavity by separating the jaws and drawing the tongue backwards.—ALFRED T. COWIE.

KAY, H. D. (1945.) **The secretion of milk.**—*Nature, Lond.* **156.** 159–162. **1606**

This is a discourse on various aspects of the phenomenon of milk secretion. The available methods for investigating the biochemistry of milk secretion and the technical difficulties involved are reviewed. Special reference is made to the techniques involving simul-

taneous arterial and venous blood sampling for determining the changes taking place in the blood in its passage through the udder. The changes thus observed, their relationship to the constituents of the milk and the energy metabolism of the gland are discussed in the light of results obtained by udder perfusion and mammary tissue respiration experiments.—A. T. COWIE.

DURAN-JORDA, F. (1945.) **Local haemopoiesis as seen in the abomasum of the cow and sheep.**—*Vet. J.* **101.** 191–194. **1607**

The established association between gastric and intestinal diseases of man and haemopoiesis led the author to investigate the possible haemopoietic activity of the gastric and intestinal mucosa of normal animals

The abomasum of the cow and sheep proved to be the most useful medium for this investigation. In the mucosa, eosinophiles were found in large numbers and their origin from the gastric oxyntic cells was demonstrated. Groups of these eosinophiles were seen to develop into red blood cells *in situ*, while other groups migrated to the accepted haemopoietic organs and there developed the blood-forming granules. Having secreted and expelled the full-sized red blood cell, the gastric cell becomes a lymphocyte. It is now fixed in the gastric mucosa and again converted into an oxyntic cell, thus completing the evolutive cellular cycle.

In view of these investigations on the ruminant stomach, a scientific study of diets to speed up regeneration of the red blood corpuscles might well be initiated. —C. W. OTTAWAY.

BOYD, W. C. (1945.) **Rh blood factors: an orientation review.**—*Arch. Path.* **40.** 114–127. **1608**

The great mass of knowledge concerning blood groups, the Rh factor and foetal mortality which has grown up since the individual differences in human blood were first discovered by LANDSTEINER is succinctly reviewed. The literature is difficult for the non-specialist, but as B. remarks, " the new developments, however, are not beyond the grasp of any educated person . . . if he understands fundamental principles of genetics and if he knows a little about the antibody response which organisms may make to a foreign antigen ". There must be many who require to have an intelligent grasp of these developments and such readers will find their requirements well met by this article.

A connected story is given of the links in the chain of discoveries leading up to an understanding of the causation of foetal oedema, icterus gravis neonatorum and anaemia of the newborn now grouped under the name erythroblastosis. These conditions may develop if a mother lacking the Rh factor becomes pregnant with a child which inherits this factor from its father. The Rh factor passes from the foetus to the mother and as a result the mother produces anti-Rh agglutinins. These then pass back through the placenta to the foetus and cause destruction of the erythrocytes. The genetics of inheritance of the Rh factor, agglutinins, isoimmunization, forensic implications, etc., are dealt with, the whole forming a very readable and compact exposition of a complicated subject. The possible applications of this knowledge to diseases of the newborn in the domestic animals make a review of this type of interest to veterinary surgeons.—M. C.

WUNDERLY, C. (1944.) 49. Studien zur Messung des cellulären Faktors. [**Studies on the measurement of cellular factors. 49. The blood sedimentation rate.**]—*Helv. chim. Acta.* **27.** 417–426. **1609**

The sedimentation rate of red cells depends not only on the composition of the plasma but also on certain characters of the cells. W. studied the " salting-out " of the proteins of the plasma of man, horses and cattle, using a phosphate solution at constant pH. The rapidity of sedimentation in the horse can be explained on the basis of the high content of fibrinogen and globulin in the plasma of this species. Sedimentation in cattle, however, is extremely slow and cannot be explained merely by the relative concentration of the plasma proteins. If it could, the sedimentation rate in cattle would be calculated as intermediate between that of man and the horse whereas in fact it is much slower than in man. Analysis of the individual proteins of the plasma in the three species shows considerable differences in the proportion of the various amino acids, but these are not sufficient to explain the extremely slow and almost unmeasurable sedimentation rate in cattle which W. considers must be due to properties residing in the surface layers of the red cells. Sedimentation studies of erythrocytes of man, horse and cattle in protein-free plasma substitutes (pectin solutions) confirm this view, since sedimentation in cattle is again extremely slow.—E. G. WHITE.

WIEDEMANN, E. (1944.) Elektrophorese-Versuche am Serum. [1.] [**Electrophoresis experiments on serum. 1.**]—*Schweiz. med. Wschr.* **74.** Reprint pp. 9. **1610**

WIEDEMANN, E. (1945.) Elektrophorese-Versuche am Serum. 2 Mitteilung. [**Electrophoresis experiments on serum. 2.**]—*Ibid.* **75.** Reprint pp. 19. **1611**

1 & 2. These two articles review briefly work carried out since 1937 on the electrophoretic properties of serum proteins. The technique used by W. is described and the apparatus is illustrated. The results obtained in a variety of pathological conditions in man are given in tabular form.—E. G. WHITE.

COPLEY, A. L., & ROBB, T. P. (1942.) **Studies on platelets. III. The effect of heparin in vivo on the platelet count in mice and dogs.**—*Amer. J. clin. Path.* **12.** 563–570. [For part I, see *V. B.* **13.** 255.] **1612**

The authors record the bleeding time, coagulation time and platelet count in mice and dogs after single and repeated injections of heparin. In mice there was no significant change in the platelet count following single or repeated subcutaneous injections of heparin, and no correlation was observed between bleeding time and platelet count or between coagulation time and platelet count. In dogs, intravenous injections of heparin produced an initial decrease in the platelet count followed by a rise to or above the original level. The authors discuss the relationship of the number of platelets to the mechanism of haemostasis and also the mechanism of change of platelet count. They suggest that the decrease in platelet count is due to agglutination or disintegration of the platelets and that the subsequent rise is due to redistribution or regeneration of the platelets.—T. E. GIBSON.

YOFFEY, J. M., & PARNELL, J. (1944.) **The lymphocyte content of rabbit bone marrow.**—*J. Anat.* **78.** 109–112. [Abst. in *Stain Tech.* **20.** 30–31, copied *verbatim.* Signed : WARREN ANDREW.] **1613**

A technic is given for determining the cell content of marrow by placing a weighed quantity of marrow in a known volume of plasma and then breaking up the marrow. The cells become suspended in the plasma and the suspension is then treated much like blood to obtain total and differential counts. The marrow need not be weighed by itself. After an opening has been made in the bone and an undetermined amount of marrow removed with a needle, and placed in the previously weighed plasma, the suspension itself is weighed and the marrow weight thus easily determined. The authors' studies were made on rabbit marrow, which contained 469,000 nucleated cells per cu. mm.

of marrow (61,000 of them lymphocytes). Such a method, while relatively simple, will allow of quantitative studies on marrow by means of the smear rather than the section method. The specific gravity of red marrow has been found to be only very slightly more than 1·0, so that the weight in grams may be taken as equivalent to the volume in cubic centimeters.

MANN, T. (1945.) **Studies on the metabolism of semen. 1. General aspects. Occurrence and distribution of cytochrome, certain enzymes and coenzymes. 2. Glycolysis in spermatozoa.**—*Biochem. J.* **39.** 451–458 & 458–465. **1614**

1. Spermatozoa of the ram, bull and boar contain cytochromes a, b and c, adenyl pyrophosphoric acid and powerful dephosphorylating enzymes (particularly "5 nucleotidase"). Spermatozoa contain iron, zinc and copper in much higher concentrations than in seminal plasma.

2. The intermediary reactions of glycolysis of spermatozoa are similar to those of other tissues and involve phosphorylation. Spermatozoa can metabolize either glucose or fructose but the natural sugar of seminal plasma is fructose.—E. BOYLAND.

PRICE, D. (1944.) **The development of reactivity in the accessory reproductive organs of castrated and spayed rats injected with testosterone propionate.**—*Physiol. Zool.* **17.** 377–391. [Abst. in *Exp. Sta. Rec.* **92.** 498, copied *verbatim.*] **1615**

The responsiveness of the gonads and accessory reproductive organs of castrated and spayed rats to exogenous hormones was found to depend on the age of the treated animals as well as on other conditions. Males and females gonadectomized at 8 days of age were injected daily for 6 days with graded doses of testosterone propionate beginning at 8, 20, 30, 50, and 70 days of age. In another series of experiments males were castrated at 20, 30, 50, or 70 days of age and injected immediately for the 6-day period as in the first experiment. The minimum effective dose for responsiveness by the male prostate at 8–13 days was 1 μg. daily, but better development occurred at more advanced age, so that the minimum effective dose was 5 μg. at 36–56 days and 10 μg. at 76 days. The responsiveness was maintained in the prostate through the seventy-sixth day, but was somewhat diminished in the seminal vesicles and uterus. As age advanced there seemed to be no change in responsivity up to 76 days. The results were based on the weights of the seminal vesicles and on a histological study of them for animals receiving doses of 1, 5, 10, 25, 50, and 100 μg. daily for 6 days.

GREEN, W. W., & WINTERS, L. M. (1944.) **Histological studies of boar testes.**—*J. Morph.* **75.** 291–301. [Abst. in *Exp. Sta. Rec.* **92.** 496–497, copied *verbatim.*] **1616**

The rate of testicular development of boars castrated at 8–28 weeks of age was ascertained by histological studies. There were significant differences between inbred groups in the rate of increase of testicular weight and numbers of spermatogonia and primary spermatocytes and in the absolute number of spermatogonia per seminiferous tubule cross section and number and diameter of Leydig cells. There were no group differences in the diameter or rate of increase in the diameter of seminiferous tubules. It was thus evident that genetic constitution of the animal should be considered when studying testicular development. This was more closely related to body weight than age; the left testis was heavier than the right, and season of farrow possibly influenced the rate of testicular development, but these differences were not statistically significant. As line differences have been found in growth responses to castration, sexual activity of boars, time of puberty, 17-ketosteroid excretion, fertility and growth rate, red cell count, hemoglobin, and serum protein content of the blood, it is not surprising to find differences within these lines in the rate of testicular development.

•KRICHESKY, B., & MANDEL, H. (1943.) **Anatomic and histologic studies of the sex accessories of the male rabbit.**—*Univ. Calif. Publ. Zool.* **47.** 175–195. [Abst. from abst. in *Exp. Sta. Rec.* **90.** 174.] **1617**

The microanatomy and postembryonic development of the sex accessories in 23 male rabbits are described, with more detailed studies of 10 others.

DAVIES, D. V. (1946.) **The lymphatics of the synovial membrane.**—*J. Anat.* **80.** 21–23. [Author's summary slightly amended.] **1618**

The lymphatic vessels of the synovial membrane were studied in the metacarpophalangeal and metatarsophalangeal joints of recently slaughtered cattle, using 50% mandarin black ink as a medium. The synovial lymphatic plexus is described, together with its extra-articular connexions. In some experiments the blood vessels were injected, but no evidence was seen of drainage of the synovial lymphatics directly into the neighbouring veins. All injections were confirmed histologically.

LEV, M., & SAPHIR, O. (1945.) **A theory of transposition of the arterial trunks based on the phylogenetic and ontogenetic development of the heart.**—*Arch. Path.* **39.** 172–183. **1619**

Transposition of the arterial trunks is defined as that condition in which the great trunks have undergone an alteration in their positions relative to each other or to the ventricles from which they emerged whereby the aorta comes to lie in the path of unaerated blood from the ventricles.

Four types are listed: (1) defect of the ventricular septum, (2) partial transposition, so that the aorta and pulmonary artery arise from the same ventricle, (3) complete transposition, so that the aorta arises from the right ventricle and the pulmonary artery from the left ventricle and (4) miscellaneous types, including *truncus communis* and other rare conditions not included in the above.

The authors argue a theory of transposition by reviewing the evolution of the mammalian heart. Two outstanding factors revealed in the phylogenetic survey from fish to mammal are the establishment of a pulmonary circuit associated with air breathing and increase of blood pressure. These factors are connected with absorption into the ventricle of the bulbus found at the aortic origin of the piscine and reptilian heart, and torsion of the heart chambers.

It is suggested that transposition results from abnormality in absorption of the bulbus in the second stage of heart development.—C. W. OTTAWAY.

COMPTE, E. J. (1944.) Organos branquiógenos en las aves. (Tiroides, paratiroides y cuerpo post-branquial.) Glomo carotideo. Sus relaciones anatómicas. [**Branchiogenous organs in birds. The thyroid, parathyroid and the post-brancheal body.**]—*Rev. Fac. Agron. Vet., B. Aires.* **11.** 3–16. [English and Portuguese summaries.] [Abst. from English summary.] **1620**

The morphology is described for hens and doves of each of the branchial organs (thyroid, parathyroid and post-branchial body), together with their anatomical relations to each other and to the carotid glomus.

See also abstr. **1673-1675** (artificial insemination).

POISONS AND POISONING

*Cole, C. (1943.) **Lead and ducks.**—*Wis. Conserv. Bull.* **8.** No. 4. 17–18. [Abst. in *Biol. Abstr.* Sect. F. **19.** 2, slightly amended. Signed: H. P. K. Agersborg.] **1621**

Many waterfowl are lost each year from lead poisoning. The author, having seen swans and ducks dying and dead, became interested in finding out the cause. After securing permission from the U.S. Wildlife Service and the Wisconsin Conservation Department to capture and to have in possession wild water fowl, he made observations on various spp. of ducks and on a swan. As many as 75 shots were found in the gizzard. The birds in many cases tried to force the shots out by stuffing themselves with sand, mud and/or plant material but the shots were apparently unable to pass beyond the gizzard and the birds therefore starved to death. Some birds died from infection of the lungs by aspergillosis. One swan had 110 shots of many sizes in its gizzard. The birds which were cured were cleaned out with water, milk and mild laxative pills, and fed milk for a while, and then put out on a large pond in the sanctuary. There is need for a type of shot that will disintegrate rapidly in water.

Shrewsbury, C. L., Hatfield, J. D., Doyle, L. P., & Andrews, F. N. (1944.) **Some effects of fluorine in the nutrition of sheep.**—*Bull. Ind. agric. Exp. Sta.* No. 499. pp. 20. **1622**

Owing to the difficulty of obtaining phosphates for feeding livestock, the determination of the levels of fluorine-containing minerals, such as naturally occurring calcium phosphate, which can be safely fed is important. This investigation was designed to provide additional evidence on the tolerance of F by growing lambs and breeding ewes. The phosphate rock contained 3·85%F. It was added to the ration in different experiments to give 1·5 mg., 3 mg., or 6 mg. of F per kg. body weight per sheep per day. The teeth of the lambs and ewes were examined at intervals for abnormalities. Bones were tested P.M. for breaking strength and were chemically analysed and examination was made of the thyroid and pituitary glands in some of the experiments to find the influence of F. Based on the growth of the lambs, the maximum safe level of F was 1·5–3·0 mg. per day per kg. body weight. Growth in general tended to diminish with increase of F in the ration.

The teeth of animals receiving 1·5 mg. F per kg. body weight per day appeared to be normal except for discoloration. In those receiving 6 mg. per kg. daily there was erosion of the enamel.

The characteristics of the lamb bones were not affected significantly by the concentrations of F studied.

The body weight of the breeding ewes was maintained in the first year but was affected adversely by all levels of F and particularly by the highest level, in the second and third years. The number of lambs born per ewe during the third year period was not influenced and there was practically no effect on the weight of lambs at birth and the livability during the first weeks. The growth of lambs produced in the third year of the experiment was not affected by the F ingested by the ewes. The F content of the ration had no apparent effect on the wool of the ewes, neither were there abnormal relationships in the blood Ca and P of the ewes or the lambs. The adverse effect of F on the growth of lambs was not counteracted by the presence of adequate I_2 in the ration. F increased the storage of J_2 in the thyroid gland.

Ten tables are given with much detailed information and a list of relevant literature is cited.—E. M. J.

Harms. (1943.) Kalkstickstoffvergiftungen bei Tieren unter besonderer Berücksichtigung des Wildes. **[Calcium cyanamide poisoning of animals, especially game animals.]**—*Berl. Münch. tierärztl. Wschr.*/ *Wien. tierärztl. Mschr.* July 23rd. 239–241. **1623**

Literature dealing with calcium cyanamide poisoning of animals is reviewed. In feeding experiments carried out on fowls, rabbits, g. pigs and sheep all the animals refused food contaminated with calcium cyanamide, although no other food was available and the animals nearly died of starvation, suffering considerable loss of weight; the reaction was the same whether the poison admixed to the feeding stuffs was powdered or granular. In a few cases very small amounts of contaminated food were consumed without any noticeable effect on the health of the animals. The lethal dose for fowls was established by administering graded amounts and was found to be 6 g. per kg. body weight. Examination P.M. revealed irritation and in parts severe inflammation and ulceration of the mucosa of the digestive tract as far down as the beginning of the small intestine. It is pointed out that food free from contamination is always available to game animals, even if some meadows are fertilized with calcium cyanamide, and that, moreover, the natural instincts are better developed in these than in the related experimental animals used. There is therefore good reason to suppose that game animals will avoid contaminated food or, should no alternative food be available, will consume only such small amounts as will constitute no danger to health.—R. Morganstern.

Featherly, H. I. (1945.) **Some plants poisonous to livestock in Oklahoma.**—*Circ. Okla. agric. Exp. Sta.* No. C–118. pp. 16. **1624**

This popular bulletin for farmers and livestock men is designed to assist in identifying the more important poisonous plants affecting animals in Oklahoma. Details are given of control measures designed to avoid losses, mainly from the aspect of preventing access to the plants. For each plant are considered the general botanical features of identification, the type of animal affected, the poisonous parts of the plant, the most dangerous season, the symptoms, remedy and means of prevention. The plants considered include deadly nightshade (*Solanum nigrum*), coffee bean weed (*Glottidium vesicarium*), ergot (*Claviceps purpurea*), cocklebur (*Xanthium* spp.), death camas (*Zygademus nuttallii*), larkspur (*Delphinium* spp.), bitter rubberweed (*Actinea odorata*), locoweed (*Astragalus*, *Oxytropis* spp.), sorghums (*Sorghum* spp.), water hemlock (*Cicuta maculata*), white snake root (*Eupatorium urticaefolium*), oak (*Quercus* spp., acorns and young shoots). In a general discussion and summing up, F. mentions some reasons for annual fluctuations in the incidence of plant poisoning.—A. Eden.

*Gates, F. C. (1945.) **Amphiachyris dracunculoides as a poisonous plant.**—*Trans. Kans. Acad. Sci.* **48.** 87–89. [Abst. in *Exp. Sta. Rec.* **93.** 618, copied *verbatim.*] **1625**

This plant, which increased in Eastern Kansas to an amazing extent during the recent drought decade, was found to be seldom eaten but capable of causing gastroenteritis, at least in cattle. It was also responsible for a disturbance of the eyes, coughs, and dermatitis under field conditions, at least in human beings and calves.

Cunningham, I. J., & Hopkirk C. S. M. (1945.)

Experimental poisoning of sheep by ngaio (Myoporum laetum).—*N.Z. J. Sci. Tech.* Sect. A. **26.** 333–339. **1626**

Poisoning of stock following the ingestion of ngaio [a small tree native to New Zealand] was reported in cattle, horses and pigs. The experiments described were conducted on sheep and rats to obtain detailed information. The rapid course of ngaio poisoning in natural cases in all species gave little opportunity to study the symptoms and pathology of the condition. It was observed that 7·5 g. dried leaves per kg. body weight killed sheep in approximately 18 hours. Lower doses caused depression, loss of appetite, icterus and photosensitivity. The primary lesions were congestion of the liver and alimentary tract. Icterus and photosensitivity appeared to be secondary and due to the accumulation of bilirubin and phylloerythrin in the circulation resulting from failure of bile excretion, which, in turn, was caused by congestion of the liver. —M. B. BUDDLE.

DAVIS, G. K., MEHRHOF, N. R., & MCKINNEY, R. S. (1946.) **Effect of tung meal in rations for growing chicks.**—*Poult. Sci.* **25.** 74–79. **1627**

Tung meal or ground tung press cake is a by-product of the production of tung oil from tung nuts. Its protein content is such that if it could be rendered safe, the product might be of value as a protein supplement in livestock and poultry feeds. The toxicity of tung meal has already been noted by other workers but it was suggested by MCKINNEY (1942) that heat treatment of solvent-extracted meal might destroy the toxic principle. The present experiments were therefore carried out with tung meal processed by heating without solvent extraction, and in addition part of the tung meal was sifted to remove the larger particles of shell.

Groups of two-day-old chicks were fed on 5 and 10% heat-treated, heat-treated and sifted, and raw tung meals. The latter, at a level of 15%, was included in order to provide specimens of typical tung meal poisoning. There was one control group, on a normal ration without the addition of tung meal in any form.

The tung meal, whatever its treatment, proved toxic and caused heavy mortality at levels of 10 and 15%, whilst at 5% and higher levels it interfered with feed utilization; none of the groups fed on tung meal gained weight at the same rate as the control group. The symptoms of poisoning and the distinctive P.M. findings in the chicks which died, are described fully. —J. D. BLAXLAND.

CLARE, N. T. (1945.) **Photosensitivity diseases in New Zealand. IV. The photosensitizing agent in Southdown photosensitivity.**—*N.Z. J. Sci. Tech.* Sect. A. **27.** 23–31. [For part III, see *V. B.* **15.** 405.] **1628**

Reference has been made in other communications to a photosensitization which occurs only in certain lines of purebred Southdowns in New Zealand. This disease may be distinguished from facial eczema by the absence of clinical icterus and of the liver lesions typical of the latter disease. However, the persistent mild van den Bergh reaction and the low rate of excretion of rose bengal indicate that some derangement of liver function is involved. These observations indicated that phylloerythrin was also present in the blood of photosensitive Southdowns; coproporphyrin was present in small amounts in both blood and urine. The photosensitive Southdown lambs with coproporphyrin in the blood were kept from access to chlorophyll and did not develop lesions on exposure to sunlight. It was concluded that the coproporphyrin found in this condition was not sufficient to cause photosensitivity and that the agent responsible was phylloerythrin which was present in the peripheral circulation as a result of liver dysfunction.—M. B. BUDDLE.

See also absts. **1497** (malicious poisoning of stock), **1500** (human food poisoning), **1565** (tick paralysis), **1578** (bracken and bovine haematuria), **1587** (defluorinated phosphates), **1643**, **1663** (vermin control).

PHARMACOLOGY, THERAPEUTICS AND DISINFECTION

ROSS, C. A., & POTH, E. J. (1945.) **The production of bactericidal activity in cod-liver oil by oxidation.**—*J. Lab. clin. Med.* **30.** 226–232. [Authors' summary copied *verbatim*.] **1629**

Fresh U.S.P. cod-liver oil has no bactericidal activity. Cod-liver oil acquires bactericidal activity during oxidation. This process is accelerated when the natural antioxidants in the oils are adsorbed by Norit and can be inhibited by the addition of the antioxidant, hydroquinone. Aldehydes are always present in the vapors given off by cod-liver oil when these vapors acquire bactericidal activity. It is suggested that acrolein, a bactericidal substance, may be produced by the auto-oxidation of cod-liver oil.

—. (1945.) **Penicillin. Brochure with annotated bibliography 1945.** pp. 191. Rahway, N.J.: Merck & Co., Inc. 4to. **1630**

In this revised report on penicillin, the original brochure [see *V. B.* **15.** 94] has been combined with an extensive annotated bibliography. Abstracts of important articles on penicillin which have been published up to the end of July, 1944 are included, together with abstracts of certain other articles, incorporating new developments or throwing further light on some special phase of penicillin therapy. The text of the brochure is arranged in a similar manner to the original one and there are numerous tables and figures. The annotated bibliography of 496 abstracts is divided into sections corresponding with those of the brochure, followed by abstracts of or references to 25 review articles. There are also extensive author and subject indexes.—E. M. J.

HARTLEY, P. (1945.) **World standard and unit for penicillin.**—*Science.* **101.** 637–638. **1631**

An international meeting under the auspices of the League of Nations' permanent standards commission met to decide on an international unit for penicillin. A quantity of pure penicillin sodium salt is to be adopted as the international standard, and kept at the National Institute for Medical Research, London, whence it will be supplied to national control centres in other countries. A standard pure penicillin calcium salt is also to be kept.

The international unit is defined as the specific penicillin activity contained in 0·6 μg. of the international penicillin standard, and 2·7 μg. of the present international penicillin working standard is accepted as containing one I.U. of penicillin.

It is noted that the new I.U. is approximately equivalent to the Oxford unit.—R. M. LOOSMORE.

YERMOLIEVA, Z., KAPLUN, T., & LEVITOV, M. (1945.) **Penicillin crustosin.**—*Amer. Rev. Soviet. Med.* **2.** 247–250. [Abst. in *Bull. War Med.* **6.** 53, copied *verbatim*. Signed: L. P. GARROD.] **1632**

Of 93 varieties of *Penicillium* studied at the All-Union Institute of Experimental Medicine (U.S.S.R.), a strain of *Penicillium crustosum* was the most active

producer of an antibacterial agent. This substance, known as "penicillin crustosin", has been extracted from cultures of the mould, shown to behave *in vitro* and in the infected experimental animal like penicillin, and finally used with great success in the treatment of many cases of wound sepsis. [This is a very brief general account of an extensive research, and hence it lacks detail on many interesting points. It is not clear to what extent the product has been purified; whether it is in fact penicillin, although produced by another species of mould; and why systemic treatment succeeded when only small doses were administered at long intervals.]

JENSEN, K. A., & KIOER, I. (1945.) **Studies on methods for protraction of the effect of penecillin.**—*Acta path. microbiol. scand.* **22.** 211–229. **1633**

Although the effect of penicillin can be prolonged by incorporating it in beeswax-peanut oil mixtures, better prolongation can be attained by addition of adrenalin. If 75,000 units of penicillin in 5 ml. fluid are injected into a human being the optimum delaying effect is obtained with 1 : 33,000 of adrenalin. The combined treatment has been shown to be effective in treatment of staphylococcal and gonorrheal infections in man and pneumococcal infections in mice with fewer injections than are required with penicillin alone.

—E. BOYLAND.

ALSTRÖM, I. (1941.) Sulfanilamidens resorption, acetylering, fördelning och elimination hos häst. **[The resorption, acetylation, distribution, and elimination of sulphanilamide in horses].**—*Skand. VetTidskr.* **31.** 649–663. [English summary.] Reprinted in *Medd. Vet.-Høgsk. Stockh.* **15.** (1941.) **1634**

Chemotherapeutic research preceding and including sulphonamide investigation is discussed and the relative therapeutic merits of different sulphonamide preparations administered to the horse are described. The sulphanilamide contents of the blood and other normal and pathological body fluids were compared. Solutions or emulsions of sulphanilamide administered orally are absorbed more rapidly than the corresponding solid preparations. Absorption is more rapid in dogs and horses than in cattle and the latter require a larger dose per kg. body weight to attain an effective blood sulphanilamide concentration. Obstruction to the passage of intestinal contents retards absorption. Acetylation occurs in the horse, 12–20% of the total blood sulphanilamide being in this form. Dogs do not generally acetylate sulphanilamide. Elimination is retarded by renal injury and reduction of water intake. Sulphathiazole is eliminated more rapidly than sulphanilamide and sulphapyridine.—E. F. MCCARTHY.

SEELEY, H. W., Jr., ANDERSON, E. O., PLASTRIDGE, W. N., & PEARSON, P. (1945.) **Non-permeability of the lactating bovine mammary gland to penicillin.**—*Science.* **102.** 44–45. **1635**

An experiment was designed to find out whether penicillin was excreted in the milk after intravenous injection. A mastitis-free Jersey heifer was injected intravenously with 80,000 Oxford units of penicillin calcium in eight ml. of 0·95% saline. Samples of milk were collected at half-hourly intervals for six hours, at hourly intervals for the next six hours, and again after 24 hours. Penicillin assays were carried out by the cup method, preliminary experiments having shown that the method is critical to 0·2 Oxford unit in milk solutions. No penicillin was demonstrated in any sample.

The experiment was repeated with two doses of 500,000 Oxford units given with an interval of about 1 min. The same technique was followed except that in the first six-hour period the samples were pooled, and the cream and skim-milk tested separately. Again, no penicillin was demonstrated in any sample.

The authors conclude that penicillin given intravenously is of no use in the treatment of chronic bovine mastitis.—R. M. LOOSMORE.

*MEINECKE, H. (1942.) "Equisal" und "Jodoxylan-Vaccine" bei der Druse des Pferdes in therapeutischer und prophylaktischer Anwendung. **["Equisal" and "iodoxylan-vaccine" for strangles in horses.]**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **51/49.** 277.] **1636**

It is stated that 20 ml. of "equisal" given intravenously and 20 ml. of "iodoxylan-vaccine" given subcutaneously every other day reduced the duration of strangles in a series of horses to an average of 11 days and reduced abscess formation in the submaxillary region to 13%. Smaller doses were not satisfactory and prophylactic treatment only gave moderate results.

—R. A. ROPER.

GOTH, A. (1945.) **The antitubercular activity of aspergillic acid and its probable mode of action.**—*J. Lab. clin. Med.* **30.** 899–902. [Author's conclusions copied *verbatim.*] **1637**

Aspergillic acid in low concentrations inhibits the growth of human strains of *Myco. tuberculosis.* Suggestive evidence is presented which indicates that the mode of action of aspergillic acid can be explained on the basis of interference with the utilization of iron by the tubercle bacillus.

ANON. (1946.) **Streptomycin in tuberculosis.**—*Brit. med. J.* Feb. 23rd. 278–279. **1638**

Streptomycin, an antibiotic from *Actinomyces griseus*, was active in inhibiting growth of tubercle bacilli *in vitro* in concentrations of 0·3 mg. per 100 ml. medium. The drug also had effect on TB. in g. pigs, being much superior to the sulphone derivative, promin. The two drugs however appeared to have a synergistic action. Patients were given doses of 100,000 to 150,000 units of streptomycin, at 3–4 hourly intervals, for periods of up to three months; some of the patients became sensitized to the drug, but patients with recent progressive lesions of the fine widely distributed type showed prompt improvement. Cases with fibrocaseous lesions did not respond but four cases of infection of the urino-genital tract showed marked improvement. Streptomycin should be used as a supplementary treatment in cases of early and haematogenous forms of pulmonary TB., TB. of the urinogenital system, suppurative lymphadenitis and early miliary TB. Streptomycin is used in America for treatment of infections by Gram-negative bacteria, such as cystitis and pyelitis, typhoid, dysentery and salmonella infections, meningitis due to *Haemophilus influenzae*, and tularaemia.—E. BOYLAND.

FAGET, G. H., & POGGE, R. C. (1945.) **The therapeutic effect of promin in leprosy.**—*Publ. Hlth. Rep., Wash.* **60.** 1165–1171. [Authors' conclusions copied *verbatim.*] **1639**

Evidence of clinical improvement in a study of 137 leprosy patients treated with promin indicates that at present it is the treatment of choice for this disease. While it cannot be proved that promin possesses any chemotherapeutic properties against leprosy this seems to be the logical explanation for its mode of action in this disease. It is hoped, however, that further research will discover a still more powerful chemotherapeutic drug for the mycobacterial diseases.

BELL, J. F., & KAHN, O. B. (1945.) **Efficacy of some drugs and biologic preparations as therapeutic agents for tularemia.**—*Arch. intern. Med.* **75.** 155–158. **1640**

G. pigs experimentally infected with the Vavenby strain of *Pasteurella tularensis* were treated with sulphanilamide, sulphadiazine, sulphamerazine, acriflavine, metaphen, iodide and bismuth, bismuth and aminophenylarsonate, mapharsen, stibophen (antimony), hyperimmune antitularaemic horse serum and penicillin. None of the substances had any clear therapeutic action.
—E. BOYLAND.

I. MOUQUIN, BASTIN & LEFÈVRE. (1944.) Un cas de guérison de botulisme aigu grave traité par la respiration artificielle (poumon d'acier). **[Cure in a case of botulism treated by artificial respiration (iron lung).]**—*Bull. Mém. Soc. Méd. Hôpit. Paris.* No. 25–40. pp. 430–432. **1641**

II. LEGROUX, R., JÉRAMEC, C., & LEVADITI, J. C. (1944.) Traitement du botulisme aigu expérimental au moyen de la sérothérapie et du " poumon d'acier ". **[Treatment of acute experimental botulism by artificial respiration.]**—*Ibid.* pp. 432–433. **1642**

[Absts. in *Bull. Hyg., Lond.* **20.** 567–568, copied *verbatim.* Signed: CHARLES WILCOCKS.]

I. The authors give an account of a case of botulism in a patient aged 18, who was treated with anatoxin and antitoxin and who, when respiration became difficult, was placed in a respirator (iron lung) and remained there for 12 days. During that period the worst of the illness was passed and she was discharged from hospital, completely cured, two weeks after being removed from the respirator. The diagnosis of botulism was established; infection originated in ham which was proved to contain spores of Cl. botulinum, and which gave rise to another case. The signs of involvement of the nervous system included ptosis and paresis of the muscles of the pharynx and larynx, and these were evident less than 30 hours after the ham was eaten.

The authors admit that the patient might have recovered without artificial respiration, but point out that the symptoms appeared early and were severe; they are therefore inclined to think that the use of the respirator did save the life of the patient.

II. Legroux and his colleague make the point that in fatal botulism in man, death is due to arrest of respiration, the heart sometimes continuing to beat for several hours after breathing has ceased; the same is true in experimentally infected animals. The authors have not, however, been able to prevent death in animals, by artificial respiration, though they have postponed it, but they point out that a combination of artificial respiration and serotherapy gives results better than can be obtained by either method alone. In man, death is probable if bilateral ptosis, midriasis and muscular weakness supervene rapidly in 30–48 hours after ingestion of the toxic material. If the use of a respirator is reserved for such cases it may be possible to judge its efficacy in saving life.

HERRICK, J. A., & KEMPF, J. E. (1944.) **A study of the fungistatic and fungicidal properties and of the toxicity for mice of sodium azide.**—*J. Bact.* **48.** 331–336. [Authors' summary copied *verbatim.*] **1643**

The fungistatic and fungicidal properties of NaN_3 have been investigated. Nine species of fungi were studied; the growth of all was completely inhibited by 0·01% NaN_3. A concentration of 0·001% caused pronounced inhibition in all of the species, while 0·0001% had no apparent inhibitor action.

With the exception of *Histoplasma capsulatum*, none of the fungi was killed by exposures of 24 hours to 5% NaN_3 solutions. It is therefore concluded that the pronounced ability of NaN_3 to suppress the growth of fungi is due to its fungistatic action, and that the chemical has no practical fungicidal power.

The animal toxicity was studied by intraperitoneal injections of NaN_3 into mice. Single doses of 0·023 mg per gram of body weight, or of 0·005 mg per gram of body weight in repeated doses, were highly toxic, and the fungistatic action was reduced tenfold by the presence of blood.

CHEN, G., & GEILING, E. M. K. (1945.) **The determination of antitrypanosome effect of antimonials in vitro.**—*J. infect. Dis.* **77.** 139–143. [Authors' summary copied *verbatim.*] **1644**

A procedure is described for the assay of antitrypanosome substances in vitro. It is based upon the effect of drugs on the lowering of glucose metabolism of suspensions of *Trypanosoma equiperdum.*

The relative antitrypanosome potencies of the trivalent antimony compounds as determined by the in vitro procedure agree with those obtained by assays in vivo. For pentavalent antimony compounds, on the other hand, the value obtained by the former method is about half of that by the latter.

I. FRITZSCHE, K. (1944.) Zur Frage der Beurteilung von Therapeutika für die Bekämpfung der Hühnerkokzidiose. **[Assessing the value of therapeutic agents for the control of coccidiosis in hens.]**—*Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* June 23rd. 204–205. **1645**

II. SCHÜRMANN, E. (1944.) Erwiderung auf den Aufsatz von Fritzsche " Zur Frage der Beurteilung von Therapeutika für die Bekämpfung der Hühnerkokzidiose ". **[Reply to Fritzsche's note on " Assessing the value of therapeutic agents for the control of coccidiosis in hens ".]**—*Ibid.* 205. **1646**

I. This is a criticism of a preliminary report by SCHÜRMANN [*V. B.* **15.** 408] that " avomin " is not a suitable medicament for the treatment of avian coccidiosis. F. criticizes S. on the grounds that he used only six birds and that the technique of his experiment did not justify his assumptions. F. considers that the dimensions of the experimental coop and run should have been given, for if these were small the opportunities for reinfection would be greatly increased. S. stated only that the food and water utensils were cleaned. F. does not support S.'s opinion that no reliable pronouncement can be made on a remedy for coccidiosis if hygienic measures which by themselves are able to exert a favourable action on the course of the disease are carried out at the same time.

F. then sets out conditions which he considers essential before a true assessment of a drug can be made. These are that two similar groups of fowls must be placed on floors of wide-meshed wire and that food and water troughs should be so constructed as to render contamination impossible. The wire floor should receive daily treatment with the blowlamp. If one group of fowls is used for testing the drug whilst the other serves as a control group, daily examinations of the faeces will soon show if the oocysts in the treated group are more speedily reduced in numbers than those in the controls. P.M. results and a parasitological examination of the entire alimentary canals of both groups will then enable a decision to be made on the efficacy of the therapeutic agent used. Weight records should also be kept. F. also points out that a therapeutic agent administered *per os* may act differently on the coccidia of the small gut and of the caecum.

II. S. states that he was not studying the efficacy

of stringent hygienic precautions in the control of coccidiosis, but was endeavouring to ascertain whether "avomin" was a successful remedy when applied under practical conditions. Throughout the experiment the birds were placed in separate cages with wire-mesh floors and a run of about 150 sq. metres for only six young birds. Considerable precautions were taken within the limits set by ordinary poultry keeping, except that the blowlamp was not used on the wire-netting. S. maintains that the procedure advocated by F. does not permit of a sound judgment on any drug.—C. H. S.

HAWKINS, P. A., & KLINE, E. E. (1945.) **The treatment of cecal coccidiosis with sulfamethazine.**—*Poult. Sci.* **24.** 277–281. **1647**

The authors found that when sulphamethazine was fed to uninfected chickens it interfered with the normal weight gains. Losses from caecal coccidiosis were greatly lessened when the drug was given in the feed at concentrations of 0·4–1·0%. Treatment must be started not later than the fourth day after infection. The blood levels must reach 5·0–6·0 mg.% by the fifth day after infection to give the best results. The authors observed that saturated solutions of sulphamethazine proved ineffective when given in galvanized iron drinking troughs. [This is contrary to the findings of HORTON SMITH & TAYLOR (*V. B.* **13.** 304) and to the experience of poultry farmers who have used this treatment. If this method of treatment is used it is essential that fresh solutions be used each day as an interaction occurs with the metal of the containers, which reduces the strength of the solution.]—C. HORTON SMITH.

DINDINAUD, M. (1945.) Traitement d'une epizootie de broncho-pneumonie contagieuse des bovidés par les sulfamides aluminiques. [**Treatment of bovine infectious broncho-pneumonia with aluminium sulphonamides.**]—*Rev. Path. comp.* **45.** 323–325. **1648**

A number of infected cows were successfully treated by 13 veterinarians with lysapyrine, which is the aluminium salt of sulphapyridine, and with lysothiazole, the aluminium salt of sulphathiazole. The cattle were given daily doses of 10–20 g. (occasionally 30 g.) for 3–4 days. The drugs were well tolerated and apparently very effective in treatment of broncho-pneumonia.

—E. BOYLAND.

ANIGSTEIN, L., & BADER, M. N. (1945.) **Para-aminobenzoic acid—its effectiveness in spotted fever in guinea pigs.**—*Science.* **101.** 591–592. **1649**

The inhibitory action of *p*-aminobenzoic acid on rickettsial growth has been observed in egg yolk-sacs infected with murine typhus; the drug appears to be beneficial in the treatment of murine typhus in mice and in louse-borne typhus of man.

In order to test the protective value of the drug against Rocky Mountain spotted fever, g. pigs were given 2 g. of the powder to 100 g. of protein feed. Out of 12 animals in which the drug intake preceded the infective injection by 24 hours, five animals developed fever and two animals died, whilst out of 17 animals treated on the day of spotted fever injection, three developed fever and two developed symptoms of spotted fever and died. The death rate from spotted fever in infected untreated g. pigs was 100%.

In most of the test animals visible symptoms of spotted fever were absent, but some afebrile animals showed pathological lesions (splenomegaly), and their spleens injected into normal guinea pigs caused typical spotted fever. The afebrile test animals which survived when reinoculated with spotted fever proved to be immune, indicating that the drug has a suppressive rather than a destructive action.—U. F. RICHARDSON.

SLADE, R. (1945.) **A new British insecticide. The gamma isomer of benzene hexachloride.**—*Chem. Trade J.* **116.** 279–281. **1650**

S. gives a general review of the chemical and insecticidal properties of benzene hexachloride, which for brevity is called "666". The crude compound consists of a mixture of four isomers, of which only the gamma (gammexane) possesses insecticidal value.

Gammexane forms 10–12% of the mixed isomers and is insoluble in water, soluble in organic solvents, and stable on exposure to light, hot water and limestone. The molecule loses hydrogen chloride in the presence of alkalies such as lime water or dry lime. It acts both as a stomach and contact poison and as a fumigant. Gammexane powder gives successful control of all domestic insect pests and is exceedingly promising for many pests of sheep and cattle.

In experiments on toxicity to vertebrates, 1·25 g. of the mixed isomers per kg. body weight killed 50% of rats in seven days, when introduced into the stomach. From this and other experiments it is concluded that the use of "666" entails little danger to man or the higher animals, although the effect on the skin is not known.—W. MOORE.

ANON. (1945.) **Advances in disinfestation; DDT.**—*Lancet.* **249.** 609–610. **1651**

The use of D.D.T. in disinfesting houses from bugs is described and it is stated that all that is necessary to obtain complete control is to place a zone of D.D.T. between the bug and its food supply. Houses sprayed with a solution of 3% D.D.T. in kerosene showed no signs of reinfestation two months after treatment. Bugs allowed to crawl over a wall treated 10 months previously died within 48 hours.

A D.D.T. emulsion gave very good control of head lice on children. Over 1,000 children were treated and it is believed that D.D.T. is the best method to date of treatment of head louse infestations.

Gammexane and its use for the control of crickets in a refuse tip are also described.

A series of tests with 5% "tetmosol" soap suggested that by its use it is possible to cure scabies under normal family conditions, but that treatment with medicated soap alone is not entirely satisfactory, because carriers are able to infest contacts in the early stages of treatment.—W. MOORE.

CAMPBELL, G. A., & WEST, T. F. (1944.) **DDT, the new insecticide. A general survey and some possible paint applications.**—*J. Oil Col. Chem. Ass.* **27.** 241–262. **1652**

The first part of this paper is a summary of the original paper of LAUGER *et al.* [(1944.) *Helv. chim. Acta.* **27.** 872], describing the research which resulted in the discovery of the insecticidal properties of D.D.T. The work was directed towards finding an efficient moth-proofing agent, but D.D.T. showed an insecticidal effect not previously observed in a synthetic substance. The molecular structures of several compounds related to D.D.T. are shown, with information on their effectiveness as contact insecticides for house flies.

The second part of the paper deals with the incorporation of D.D.T. in paints and in wax floor polishes, which are extremely toxic to flies for about three months after application. The insecticidal action of such paints, however, disappears long before repainting is normally undertaken.—W. MOORE.

COBBETT, N. G., & SMITH, C. E. (1945.) **DDT has possibilities of becoming a remedy for sheep ticks.**—*J. Amer. vet. med. Ass.* **107.** 147–148. **1653**

The authors describe sheep-dipping experiments against the sheep ked (*Melophagus ovinus*), carried out

in New Mexico in the summer of 1944. Water suspensions of D.D.T. at concentrations of 0·1–1·0% were found to kill all the keds on the sheep, including unshorn lambs. Some viable pupae appear to be left in the fleece after dipping, but the adults emerging from these are apparently killed by the D.D.T. remaining in the fleece. Methyl alcohol and commercial sulphonated soya-bean oil had no stabilizing effect on the D.D.T.-water suspensions.—L. DAVIES.

SQUIBB, R. L. (1945.) **Studies on the control of the Nuche fly and cattle tick.**—*J. Anim. Sci.* **4.** 291–296. **1654**

The Nuche fly [*Dermatobia cyaniventris*] causes economic loss in countries bordering the Caribbean sea. The larvae infest cattle, rendering the hides useless for leather and frequently causing death by secondary infection. The life-history is remarkable in that the adult fly lays its eggs on mosquitoes and other Diptera, the larvae emerging and reaching the cattle when the intermediate host alights on cattle. The larvae live under the epidermis of the host for about 42 days. A rotenone in water solution (1 lb. green derris roots per gal.) killed approximately 30% of larvae *in situ*, whereas a 4% D.D.T. solution in kerosene had little effect. A spray solution combining the two insecticides applied at the rate of 400 ml. per animal is claimed also to kill all cattle ticks (*Boophilus*) in one application. —L. DAVIES.

OLSEN, O. W. (1944.) **Liver flukes in cattle and how to control them by medication.** pp. 5. Washington: U.S. Dep. Agric., Bureau of Animal Industry, Zoological Division. 4to. Mimeographed. **1655**

This leaflet gives a general account of liver fluke disease in cattle, including information on damage caused in the animal body by the fluke, the losses in the U.S.A. due to the disease, the life-cycle of the parasite and treatment. The section on treatment describes the use of hexachlorethane and is therefore of interest in those countries, including Great Britain, where this drug is not so far generally employed for the treatment of liver fluke disease. A suspension of the drug is used which contains 1 lb. hexachlorethane, 1½ oz. bentonite, ½ teaspoonful white flour and 25 fl. oz. water. Cattle are given 6½ fl. oz. of this mixture and 3-month-old calves 3½ fl. oz. Calves under three months old are not treated. The drug is stated to have a wide margin of safety for all except very debilitated animals for which it should be employed with caution.—T. E. GIBSON.

ALLEN, R. W. (1945.) **Trials with sodium fluoride as an ascaricide for swine.**—*N. Amer. Vet.* **26.** 661–664. **1656**

Six groups, each of 10 pigs, were used in this experiment, five groups being given 1% sodium fluoride in the feed for one day, and one group being kept on the medicated feed for two days. For six days after treatment the number of ascarids passed in the faeces was counted. Taking the groups together 297 ascarids out of 334 (88·9%) were passed during the post-treatment period or were found in the large intestine when the animal was slaughtered. The percentage efficiency in each of the six groups was 55%, 97%, 86%, 96%, 99% and 95% respectively. The low efficiency in the first group was largely accounted for by one pig which retained most of its worms, probably because it did not consume an appreciable quantity of the medicated feed. In a control group, 28·8% of the ascarids were passed without treatment. Diarrhoea in this group was thought to be responsible for a higher spontaneous elimination of ascarids than would usually occur. No symptoms of toxicity were seen in any of the treated pigs.—T. E. GIBSON.

DAMONTE, F. R., & CAMBEROS, H. R. (1944.) El empleo del alcohol por via venosa en el tratamiento de las afecciones pulmonares del equino. [**The use of alcohol injected intravenously in the treatment of pulmonary affections in the horse.**]—*Rev. Fac. Agron. Vet., B. Aires.* **11.** 50–62. [English and Portuguese summaries.] [English summary amended.] **1657**

The authors treated 75 horses, most of which had pulmonary complications of strangles and bronchitis, with doses of 0·5 ml. per kg. body wt. of a 33% alcoholic solution, injected intravenously and repeated at intervals according to the condition of the animals. The results obtained were considered as largely satisfactory; 52 animals were cured, in two there was no improvement, three died and the remaining 18 could not be observed.

Although it is true that the prognosis and evolution of the common pulmonary complications of strangles are generally favourable when the current classical therapeutics for this type of affections are used, the alcoholic therapy produces rapid improvement; there is decrease of temperature, the râles tend to disappear, and the nasal secretion decreases and becomes more liquid.

In animals with broncho-pneumonia, pleurisy and pulmonary gangrene, a less promising result was obtained. Best results were obtained when treatment was begun at the beginning of the infection.

While they do not claim that alcoholic solution is a panacea for pulmonary affections of horses, the authors consider that it is of inestimable value; and although the sulphonamides and penicillin are better, alcoholic solution is cheaper and more generally available.

POPPER, H., VOLK, B. W., MEYER, K. A., KOZOLL, D. D., & STEIGMANN, F. (1945.) **Evaluation of gelatin and pectin solutions as substitutes for plasma in the treatment of shock: histologic changes produced in human beings.**—*Arch. Surg.* **50.** 34–45. [Abst. in *Bull. War Med.* **6.** 23–24, copied *verbatim*. Signed: GEOFFREY DAWES.] **1658**

This paper records the experience gained by the intravenous infusion of 5 per cent. gelatin solution to 162 patients, and of pectin solution (Stearns, mol. wt. 55,000) to 155 patients. About half the patients were hospital control subjects; the remainder were suffering from various degrees of surgical, traumatic, haemorrhagic or "medical" shock. Gelatin and pectin solutions, when infused in comparable amounts, were equally efficient in producing haemodilution, as judged by the fall in haemoglobin concentration and haematocrit values. Administration of additional gelatin or pectin after the initial 1,000 c.c. produced much less haemodilution, particularly in patients suffering from anaemia and hypoproteinaemia. The gelatin and pectin solutions caused an equal rise in the erythrocyte sedimentation rate, of 12–25 mm. per hour. The principal difference between the two substances when used for intravenous infusion in man was that whereas gelatin produced relatively slight histological changes in the tissues, large doses of pectin led to the deposition of a peculiar material in various organs. Autopsy specimens were obtained from 12 patients who had received gelatin and from 10 who had received pectin. In 4 of the latter (who had been given 4·3–9·0 litres of pectin solution 28–49 days before death) this structureless material was found in the splenic pulp (producing a variable degree of splenic enlargement), in the Kupffer cells and portal triads of the liver, in glomerular loops and in the lumen of the kidney tubules, and in the capillaries and proliferated mononuclear cells of the lung. Histologically,

the picture resembled amyloidosis and included a reaction of the reticulo-endothelial cells. Though the material did not give a reaction for amyloid, it stained with ruthenium red, which has been described as a specific stain for pectin. This change was also seen in 5 rabbits which had received 295–865 c.c. of pectin solution 12–86 days before death. The authors observe that with the quantities normally used in the treatment of shock such changes in the tissues have not been noticed, and that the mode of preparation of the pectin solution may be of importance.

NICHOLL, R. J., BOUCHER, W. F., & PRINCE, R. W. (1945.) **Hemorrhagic shock. The relative effect of amino acids, amigen, and gelatin in dogs.**—*Surg. Gynec. Obstet.* **80.** 181–186. [Abst. in *Bull. War Med.* **5.** 691, copied *verbatim.* Signed: GEOFFREY DAWES.] **1659**

In these experiments, profound shock was produced in dogs by haemorrhage under local anaesthesia, followed by perfusion of 0·9 per cent. sodium chloride to wash out yet more red cells and plasma. The volume of the primary bleeding was then immediately replaced by various blood substitutes, and the efficacy of this treatment was judged by the subsequent fatality-rate. The seven dogs which were given a 10 per cent. solution of a mixture of 11 pure amino-acids, or of "Amigen" (a hydrolysate of casein and pork pancreas), all died. The most effective treatment was by infusion of washed red cells suspended in saline (10 dogs) or 3 per cent. bovine bone gelatin (15 dogs), and all the animals so treated recovered.

EVANS, E. I., HOOVER, M. J., & JAMES, G. W., III. (1945.) **The absorption of sulfonamides from the burn surface.**—*Surg. Gynec. Obstet.* **80.** 297–302. [Abst. in *Bull. War Med.* **6.** 16, copied *verbatim.* Signed: F. HAWKING.] **1660**

Two types of sulphonamide ointment were tested, both containing 5 per cent. of sulphanilamide plus 5 per cent. of sulphathiazole. In the first, an oil-in-water emulsion was used as a base, in the second a water-in-oil emulsion. Fifteen burned patients were treated with one preparation and 12 with the other. The burned areas were gently cleansed with soap and water, the easily removable skin was excised, the ointment was spread thickly over the burned area, and occlusive dressings were applied. Other supporting treatment (with plasma, etc.) was given as indicated. In four patients with extensive burns treated with the oil-in-water emulsion, the blood concentration of sulphonamide was from 10 to 28 mgm. per 100 c.c. and it was maintained at this level for from 40 to 80 hours. In four similar patients treated with the water-in-oil emulsion, the blood concentration of sulphonamide was very low (0–3 mgm. per 100 c.c.). It is concluded that if sulphonamide incorporated in an oil-in-water emulsion ("water dispersible base") is applied to a large burn, it may be absorbed too rapidly, causing toxic concentrations in the blood; sulphonamide incorporated in a water-in-oil emulsion ("oil base") is a much safer preparation to use. The oil-base preparation recommended by the authors contains:– Pea nut oil 12 parts, lanolin 41 parts, rose water ointment 41 parts, sulphanilamide (100 mesh powder) 6 parts.

See also absts. **1476** (staphylococcal anatoxitherapy), **1477** (mycophenolic acid), **1549** (chlorine disinfection), **1556**, **1557** (bacteriophage), **1677**.

HYGIENE, PUBLIC HEALTH AND VETERINARY SERVICES

SCHNEIDER, M. D. (1945.) **Isolation of *Salmonella tennessee* from frozen whole and powdered egg.**—*Bull. U.S. Army med. Dep.* **4.** 477. [Author's conclusions copied *verbatim.*] **1661**

Four cultures of *S. tennessee* (VI, VII; Z29) were isolated from both frozen whole and powdered egg with a moisture content not exceeding 2 percent. The evidence establishes Iowa and Nebraska as sources of these organisms, which so far as is known have not been previously reported in the midwestern states. The implication is that fowl may, as in the case of many other salmonellae, be the source of this type *Salmonella.*

*NYIREDY, S. (1944.) **[The mechanism of the penetration of saprophytic bacteria into the hen's egg.]**—*Közl. Összehas. élet- és kórtan Köréből.* **32.** 78. [Abst. from abst. in *Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **52/50.** 243.] **1662**

N. found that although the three membranes surrounding the egg afforded some protection against moulds and saprophytic bacteria, it was possible in time for moulds and proteolytic bacteria to gain entry. Non-proteolytic germs were unable of themselves to penetrate the membranes.—R. A. ROPER.

GREEN, D. D. (1944.) **Red squill as raticide.**—*Soap & sanit. Chem.* **20.** No. 11. 101–102 & 133. **1663**

In 1923 the principal rat poisons in use in the U.S.A. were arsenic, barium carbonate, phosphorus and strychnine, all of which are toxic to other wild and domestic animals and to human beings. Because of its emetic qualities, red squill (*Urginea maritima*) is not dangerous for animals that vomit, but as rats do not vomit it is poisonous to them. The possibility of using red squill as a rat poison is discussed.

From 1923 onwards various toxicity tests were undertaken. Powders prepared under varying conditions from fresh bulbs killed rats weighing 227 g. in doses varying from less than 32·4 mg. to 2,268 mg.; bulbs imported during 1926–35 were far less toxic than those imported from 1923–26 although similarly prepared. No product of standard toxicity could be produced which could be blended with bait materials. There was a marked difference in the susceptibility of the sexes, males requiring 2–3 times as much squill as females. Investigations continue.—S. M. G.

See also absts. **1489**, **1490** (bovine type TB. in man), **1496** (swine erysipelas in man), **1498** (reservoirs of tularaemia), **1499** (of sylvatic plague), **1500** (salmonella poisoning from eggs), **1505**, **1506** (human brucellosis), **1514** (animal ringworm in man), **1525** (leptospirosis and *Spirillum morsus-muris* in man).

TECHNIQUE AND APPARATUS

REID, J. D., & JACKSON, R. M. (1945.) **An improved method for determining the coagulase activity of staphylococci by means of the plasma agar plate.**—*J. Lab. clin. Med.* **30.** 155–160. **1664**

On a medium composed of veal infusion agar with 20% sterile plasma added, coagulase-positive staphylococci produce a grey halo around their colonies within 3–18 hours. Coagulase-negative staphylococci do not give this reaction.—I. W. BROCKLEHURST.

RUBARTH, S., & AGRELL, I. M. (1941.) Tuberkelbacillfärgning ad modum Hallberg. **[Staining of tubercle bacilli by Hallberg's method.]**—*Skand. VetTidskr.* **31.** 641–645. [English summary.] Reprinted in *Medd. Vet.-Høgsk. Stockh.* **15.** (1941.) **1665**

Staining with night-blue, as described by Hallberg, and its advantages over carbol fuchsin staining are discussed. After one and a half years' experience of both

methods used on paraffin and frozen sections the authors conclude that night-blue is useful for demonstration of tubercle bacilli in material from the horse and dog. —E. J. McCarthy.

Strogov, A. K. (1940.) Novaya sinteticheskaya sreda dlya kul'tivirovaniya mikrobov grupp Coli i Salmonella. **[New synthetic medium for cultivation of coliform and salmonella groups.]**—*Rabot. XIII Plen. vet. Sekt. Akad. sel'khoz. Nauk, Moscow, 1939.* [*Collected Works.*] pp. 187–194. **1666**

A medium containing a single source of carbon for the growth and differentiation of coliform bacteria, and to a lesser extent for their differentiation from salmonella is described. Such organisms grown for prolonged periods on the medium retained their characteristic biochemical, antigenic and virulent properties. The medium may be prepared with C from various sources, the reaction to 16 compounds being given in a table. The best growth was obtained from the use of glucose, maltose, sodium acetate or sodium citrate. For differentiation purposes, the following medium was used: NaCl 0·5%; NH_4Cl 0·6%; K_2HPO_4 0·3%; lactose 0·5%. The coliform bacteria fermented the lactose within 24 hours and when *l*(–) tryptophane was incorporated into the medium as the source of C these organisms produced indole within six hours.—L. Levenbook.

*Doetschman, W. H. (1944.) **Some suggestions in microtechnique particularly useful in microentomology and parasitology.**—*Trans. Amer. micr. Soc.* **63.** 175–178. [Abst. in *Stain Tech.* **20.** 101–102, slightly amended. Signed: Challis Randall.] **1667**

The author discusses a method to kill, fix, dehydrate, clear, stain, and mount a specimen all in one operation, using the following modification of Berlese's medium: water, 35 ml.; chloral hydrate, 20 g.; gum arabic, 20 g.; glycerin, 20 ml.; glucose syrup, 3 ml.; basic fuchsin, 10 drops or more (0·3 g. per 10 ml. 95% alcohol). The formulae for the Berlese type of media allow for considerable variation. Poor results with one group of arthropods may warrant some changes in the ingredients. Highly chitinized specimens should be treated with 10% KOH from overnight to 24 hr. Oven treatment at 37°C. to 50°C. from a few hours to one day will give a permanent mount. With this medium crystallization is absent and prepared slides are resistant to sunlight.

Air bubbles may be avoided by placing specimen in a small drop of medium on a slide, putting a drop of medium on the coverslip and inverting. Gentle pressure will cause bubbles to flow out. The use of glass bridges is recommended to protect the specimen.

Weller, T. H., & Dammin, G. J. (1945.) **The acid-ether centrifugation and the zinc sulfate flotation techniques as methods for the recovery of the eggs of** *Schistosoma mansoni.*—*Amer. J. trop. Med.* **25.** 367–374. **1668**

A study was made of the efficiency of both routine and semi-quantitative modifications of both the acid-ether centrifugation method and the zinc sulphate flotation method for the recovery of *S. mansoni* eggs from faeces. The tests were carried out on uniform suspensions prepared from 46 faecal samples known to contain *S. mansoni* eggs, the exact number present in each of the suspensions being determined by the Stoll dilution counting technique. Details are given of the method of application of the four techniques used in the investigation. The acid-ether technique was shown to be superior to the zinc sulphate flotation method, and recovered a greater number of eggs from 41 of the 46 specimens. In 25 specimens containing over 400 eggs per ml. the acid-ether method gave an average recovery of 20·6% and the routine zinc sulphate flotation method one of 4·6%. The semi-quantitative acid-ether method gave an average recovery of 48·2% and the semi-quantitative zinc sulphate method one of 22·2%. No distortion of the eggs was seen in the acid-ether preparations and there was less extraneous faecal debris in these than in the zinc sulphate preparations.

On the basis of these results it is suggested that the acid-ether technique deserves further investigation as a routine diagnostic and survey procedure for the recovery of schistosome eggs from faeces.—T. E. G.

I. Li, F., & Yang, F. (1945.) **A medium for mounting parasitic helminths. [Correspondence.]**—*Nature, Lond.* **156.** 297–298. **1669**

II. Lapage, G. (1945.) **A medium for mounting parasitic helminths. [Correspondence.]**—*Ibid.* 298. **1670**

I. A gum arabic medium is described for the mounting of parasitic nematodes. The specimen is stained and differentiated in the usual way and is then placed in Hung's solution I, consisting of 8 g. gum arabic, 20 ml. distilled water, 80 g. chloral hydrate and 12 ml. glycerin, for 1–2 hours. The specimen is then mounted in Hung's solution II which contains 20 g. gum arabic, 20 ml. distilled water, 17 g. chloral hydrate and 3 ml. glycerin. The mounting medium solidifies around the edge of the cover glass in 1–2 days and becomes quite hardened within two weeks.

II. L. calls attention to various gum arabic and chloral hydrate media which have been recommended for mounting nematodes, *viz*, Berlese's fluid, Faure's medium described by Langeron, and the method more recently described by Ratcliffe [see *V. B.* **14.** 402]. He also mentions a variety of methods for dehydrating and clearing nematodes, and expresses the hope that some of the recent work on the permeability of insect cuticle may give the key to the preparation of more perfect mounted specimens of the parasitic nematodes. —T. E. Gibson.

*Highman, B., & Lillie, R. D. (1944.) **Romanowsky staining with buffered solutions. IV. Influence of fixatives on buffer requirements.**—*J. tech. Meth.* **24.** 31–36. [Abst. in *Stain Tech.* **20.** 102, copied *verbatim.* Signed: C. Randall.] [For previous parts, see *V. B.* **12.** 318.] **1671**

Quite satisfactory differential tissue staining can be attained with most fixatives by selecting appropriate pH levels. The staining solution used by the authors was prepared as follows: stock eosinate of polychrome methylene blue, 20 ml. (0·6 g. Wright's stain, N.I.H. Lot HO, in 100 ml. each of glycerol and methanol or 0·2% eosin B, azure A in glycerol methanol); C.P. methanol, 30 ml.; C.P. acetone, 30 ml.; distilled water, 300 ml. This stain was distributed in 10 Coplin jars to each of which was added 2 cc. mixed buffer solution of graded pH levels. Two series of buffer solutions were used. The first series consisted of M/15 citric acid and M/15 anhydrous Na_2HPO_4 each in 25% methanol and the second of 25% methanol solutions of M/10 citric acid and M/5 Na_2HPO_4. Satisfactory nuclear staining of liver and kidney was required as the limit on the acid side, pink staining of smooth muscle on the alkaline.

*Stowell, R. E., & Stokes, J. M. (1944.) **Glyoxal and furfural as substitutes for formaldehyde in tissue fixation.**—*J. tech. Meth.* **24.** 25–30. [Abst. in *Stain Tech.* **20.** 103, copied *verbatim.* Signed: C. Randall.] **1672**

The authors report that furfural is not a satisfactory

substitute for formaldehyde as a general fixative for tissues. Neutralized methyl glyoxal preserves red blood cells, whereas a stock solution which is acidic would destroy them, but it does not give as satisfactory fixation of tissues as formaldehyde. Glyoxal gives less differential shrinkage of tissues and better cytoplasmic preservation of tissues than formaldehyde if used in concentrations of 2 to 6%. However, since glyoxal is less satisfactory than formaldehyde as a preservative for gross sections and is not a good substitute in Zenker's or Bouin's fluids, it can be recommended as a general substitute for formaldehyde in tissue fixation only where there is a formaldehyde shortage.

BLOM, E., & CHRISTENSEN, N. O. (1944.) En modificeret Tybromol-Katalaseprøve som Led i den rutinemaessige Undersøgelse af Tyresperma. [**A modified bromthymol-catalase test for use in the routine examination of bull semen.**]—*Medlemsbl. danske Dyrlaegeforen.* **27.** 537–547. **1673**

The bromothymol-catalase test for milk was modified for use with semen. The influence of time, temperature, admixture with blood and pathogenic organisms was investigated and a comparison of this test with other standard methods was made on semen from ten normal bulls. A catalase number over 300 indicated possible infection. Semen with a catalase number over 400 should undergo clinical and bacteriological examination. A description is given of sources of contamination which invalidate the test.—E. F. McC.

BLOM, E. (1942.) Om Bedømmelsen af Aktiviteten i Tyresperma ved Mikroskopets Hjaelp. [**Determination of the activity of bull sperms with the aid of the microscope.**]—*Medlemsbl. danske Dyrlaegeforen.* **25.** No. 3. Reprint pp. 4. **1674**

Difficulties which arise in the ordinary methods of estimating sperm motility are discussed. A microscopic examination is described based on the alteration rate of definite wave patterns observed in 3–4 drops of semen on an uncovered slide at body temperature, with a magnification of 20–50 times. The findings can be grouped into four categories indicative of good, moderate, poor and negligible motilities.—E. F. McCARTHY.

MATA, E. G., & CANO, A. E. (1943.) Instrumental para inseminacion artificial. [**Instruments for artificial insemination.**]—*1er Congr. Méd. vet. Prov. B. Aires, 1943.* pp. 263–276. **1675**

The authors review the apparatus used for semen collection and insemination in cattle, sheep and horses.

For the collection of semen from the bull they prefer the Danish or North American system, but use a shorter artificial vagina. For the insemination of cows they use a long metal and glass syringe with automatic delivery and a long tubular vaginoscope with its own lamp. To test rams for semen production when a ewe in season is not available they use an electrical stimulator, but for routine work of collection of semen they prefer an artificial vagina. The insemination of ewes is carried out with apparatus similar to that used for cows, enabling 0·05–0·1 ml. of sperm to be deposited in the cervix.

To collect semen from the stallion, they used Mackenzie's or Berliner's artificial vagina. The insemination of mares is performed with a long tubular syringe, the semen being injected into the uterus. As the vaginoscope for use in the mare is heavier and more tiring to use than that used for cows, they prefer to introduce the syringe by hand.—H. G. ARAMBURU.

OLBRYCHT, T. M. (1945.) **A new instrument for measuring animals: standardization of measurements of cattle.**—*Emp. J. exp. Agric.* **13.** 199–202. **1676**

This instrument, which is claimed to possess definite advantages over those in current use, consists of a main rod with outer and inner parts, the latter telescoping into the former. Closed, it measures 42 in. and fully extended, 78 in. For measuring heights, a side arm is screwed on to the extending (inner) part and another to a slider which moves along the main rod. Engineer's drawings of the instrument and photographs of it in use are given in the original article, together with a list of proposed standard points for measurements of cattle.—D. D. OGILVIE.

ANON. (1945.) **Destroying air-borne bacteria in various dairy operations by means of special ultra-violet lamps.**—*Nat. Butt. Cheese J.* **36.** No. 5. 41. **1677**

Suggestions are made for the use of the "sterilamp", made of finger-size tubular quartz-like glass which emits a selected band of ultra-violet radiation in the bactericidal portion of the spectrum. The lamp is recommended for milking sheds and utensil storage rooms. Ultra-violet radiations have limited penetration through material as opaque as milk and the intensity required might deteriorate the fats and proteins.
—S. M. G.

STRICKLAND, E. H. (1945.) **A method for permanently reducing the number of blowflies in screened houses.**—*Bull. Brooklyn ent. Soc.* **40.** 59–60. [Abst. in *Exp. Sta. Rec.* **93.** 607, copied *verbatim.*] **1678**

The geotactic tendency of blowflies (Calliphoridae) when walking leads them to walk up a screen, even though they will fly in any direction. The combined effect of their various responses is that all of them will eventually be brought to the upper edge of the screen. It was found that if a pencil be pushed through the meshes at one of the top corners of the screen every blowfly in the room will sooner or later be directed to it and walk out, provided the window is partly open above or below and the daylight is not dimmed by awnings.

See also absts. **1481**, **1482** (mastitis diagnosis), **1512** (rapid diagnosis of gas gangrene), **1598**, **1599** (use of tadpoles for assay of thyroid activity), **1609** (measurement of blood sedimentation rate), **1631** (international penicillin unit).

MISCELLANEOUS

WALKER, K. (1946.) **Biological dangers from atomic fission. [Correspondence.]**—*Lancet.* **250.** 69–70. **1679**

When a new industrial process has an injurious effect on health, efforts are made to discover an antidote. In the case of atomic energy, this force is known already to have a profound influence on living tissues, particularly on cells responsible for the continuation of the race. Methods have been devised to protect workers on radium and X-rays from injury, but whereas the amounts of radium in use in hospitals are only a few mg., the quantity of radioactive material about to be produced by the fission of uranium will be equivalent to thousands of grammes. It has been reported that although the general effects of atomic radiations were known to be similar to those of X-rays, very little detailed knowledge was available and that "no sure means were at hand for determining the adequacy of the precautions". The energies about to be let loose on earth will be fraught with biological danger, and the investigation of their biological consequences is urged.—E. M. J.

REPORTS

BRITISH HONDURAS. (1945.) **Annual report of the Department of Agriculture for 1944.** pp. 10. Govt. Printer. 4to. Items of veterinary interest p.4. **1680**

There is no qualified veterinary surgeon in the colony. A small outbreak of ANTHRAX in cattle was dealt with by quarantine. An outbreak of a disease resembling FOOT AND MOUTH DISEASE occurred in the Stann Creek district. An outbreak occurred in cattle in the Cayo district of the disease reported in the annual report for 1944 [see *V. B.* **16.** 211] and which was suspected to be BAT-TRANSMITTED RABIES. About 45 young cows died. Deaths ceased when the cattle were moved to fresh pasture and it is now thought that PLANT POISONING may have been the cause.—M. C.

GOLD COAST COLONY. (1945.) **Report on the Department of Animal Health for the year 1944-45.** [STEWART, J. L.] pp. 6. Accra: Govt. Printing Department; London: Crown Agents for the Colonies. fcp. 1s. **1681**

In spite of acute shortage of European professional staff, and an unprecedented drought during April to June, progress was again reported with increasing competence of the trained African veterinary staff. In spite of very marked increase in numbers of livestock, directly attributable to efficient disease control measures, the colony is still far from self-supporting in respect of beef and other livestock products. "While the people of this colony suffer from shortage of animal proteins in their diet so does the land from shortage of cattle dung. . . . Water supplies are still very poor everywhere in the livestock country."

BOVINE CONTAGIOUS PLEURO-PNEUMONIA was controlled by annual and, in certain areas, twice-yearly vaccinations.

Drought impeded operations but some 46,000 young cattle were permanently immunized against RINDERPEST. Vaccination followed 5–7 days later by double inoculation (virus and serum) was the technique in vogue in dealing with highly susceptible animals, often suffering from intercurrent disease, usually protozoan. RABIES is enzootic in parts. "The position at present is unpleasant."

Pong-Tamale Laboratory produced 760 litres of RINDERPEST vaccine, 6,800 litres rinderpest antiserum, 280,000 doses PLEURO-PNEUMONIA vaccine, 1,070 doses of FOWL POX vaccine, 450 doses of FOWL CHOLERA serum and 2,135 doses of RABIES vaccine. RABIES vaccine production was discontinued as unsatisfactory and liable to inspire false confidence in the minds of dog owners. Experiments were proceeding with RINDERPEST goat virus which would certainly reduce immunization work if it could be adapted for local cattle. Phenothiazine continued to give excellent results against *Haemonchus* infection in cattle and sheep and also ascarids in poultry. D.D.T. was hopefully expected to give some results in controlling the sand-fly pest in autumn when Simuliidae, phlebotomi and *Culicoides* worry cattle, sheep and poultry to a grave extent. Tsetse eradication schemes by riverine bush clearing continued to give satisfactory results and good progress was reported.

Dwindling supplies of cattle from French West African sources stimulated more rapid improvement and increase of local livestock. TRYPANOSOMIASIS remained the greatest limiting factor to such improvement. Increased pig production with improved strains made great progress under the Department's benevolent guidance and pig products did much to relieve the shortage of other livestock products during the critical war period. In the Krachi area the pigs were dipped regularly to advantage; despite very common prejudice this animal is reported to be of all domestic animals "the best swimmer and the hardiest in the water". Livestock improvement schemes were badly handicapped by staff shortage. Marketing and distribution of livestock and their products are discussed, a major difficulty being acute shortage of supply. Hides specially treated by burial and subsequent drying form no small part of the local diet in stew form.—S. A. E.

NIGERIA. (1944.) **Annual report on the Agricultural Department for the year 1943.** pp. 34. Lagos: Govt. Printer. 8vo. 1s. Items of veterinary interest pp. 9–13 & 16. **1682**

Bacterium coli and *Salmonella dublin* were isolated from calves at the Shika Stock Farm where persistent CALF SCOURS had given trouble for some considerable time. The Veterinary Research Officer prepared an autogenous vaccine which in combination with improved hygiene, including some fly-proofing of calf pens, appeared to reduce the virulence and incidence of the disease. Immunization of very young calves against RINDERPEST, using attenuated goat virus, was discontinued owing to rather high mortality particularly amongst unthrifty specimens.

The introduction of blood meal into the diet of calves (10 oz. per 3 lb. milk for young calves and up to ¼ lb. per head in dry meal mixtures for older calves) appeared to give very beneficial results. Good results were also recorded in feeding dried blood to calves convalescing after SCOURS. Short notes on work at the Korin Stock Farm are included, where interesting observations are being recorded in trypanosome-resistant strains of cattle, including the Gold Coast Shorthorns and N'damas. A full report on the work at this farm has been submitted separately.

Experimental work continued on the problem of fitting goats into a system of mixed farming and making use of these animals as milk producers. Milk records are kept at some experimental centres. Maintenance of a large flock of sheep for the army at Dauddwa was frustrated by BLUE TONGUE, but more success was achieved at other centres.—S. A. EVANS.

CYPRUS. (1945.) **Annual report of the Department of Agriculture for the year 1944.** pp. 8. Nicosia: Cyprus Printing Office. fcp. 1s. Items of veterinary interest pp. 5 & 7. **1683**

780,000 doses of ANTHRAX spore vaccine were prepared and issued. Investigations were continued on the acute catarrhal fever associated with STOMATITIS in sheep. Four strains of virus were passaged through 15–21 generations respectively. At first, virulence appeared to diminish but in the later passages it was regained. Samples of virulent blood were sent to Onderstepoort where cross-immunity tests showed that the virus was identical with that of BLUE TONGUE. Preliminary trials were made using BLUE TONGUE vaccine obtained from Onderstepoort, but results were disappointing. Tests were made of a *Cysticercus bovis* antigen for detection of infected cattle but results showed that the test was useless. Breeding of table rabbits was discontinued. The breeding stock in which both COCCIDIOSIS and MANGE had become established were slaughtered. Results obtained at the Government Stock Farm with Dairy Shorthorn cows, native fat-tailed sheep, Maltese goats and poultry are described. With improvement in the meat supply war-time restrictions on slaughter of stock were removed at the end of the year.

Mules to the value of £80,000 and wool valued at £35,000 were exported.—M. C.

BOOK REVIEWS

FRAUCHIGER, E. [Dr. med., Dozent für vergleichende Neurologie] & HOFMANN, W. [Dr. med. vet., ord. Prof. für Rinderheilkunde an der Universität Bern]. (1941.) Die Nervenkrankheiten des Rindes. Eine Grundlage für eine vergleichende Neurologie von Mensch und Haustier. **[The nervous diseases of cattle. A basis for comparative neurology of man and domestic animals.]** pp. 361. 139 figs. Berne: Hans Huber. 8vo. Sw.Fr. 24. **1684**

The book falls into two main parts. In the first, after a brief historical sketch, a description is given of the bovine nervous system and of the clinical investigational methods that are available for its study; a lengthy account of the cerebrospinal fluid is also given. In the second part, the diseases of the bovine nervous system are described, including those of the brain, spinal cord, meninges, cranial and spinal nerves, and autonomic nervous system; certain aspects of endocrine and muscular disorders are discussed, as are functional nervous diseases. Comparisons are made with diseases of other domestic animals and of man, diseases of interest being described even when they have not been found in cattle.

The authors have achieved their object of providing an introduction to comparative neurology for veterinary students and practitioners. They have summarized the relevant knowledge of importance already gained, and by indicating outstanding problems have provided an impulse to further comparative studies. The book will also be useful to medical neurologists. The approach to the subject is essentially comparative and critical, and the presentation is clear and interesting. The production, including photographs, drawings, and diagrams, is excellent. That the references in the short selected bibliographies are almost entirely to continental authors does not detract seriously from the value of the work.—E. COTCHIN.

LESBOUYRIES, G. [Professeur à l'Ecole nationale vétérinaire d'Alfort. Directeur de la Station d'études sur la pathologie des animaux de basse-cour. Membre de l'Académie Vétérinaire]. (1941.) La pathologie des oiseaux. **[Avian pathology.]** Vol. 1. pp. 479 & Vol. 2. pp. 481–868. 556 figs. Paris: Vigot Frères. 4to. **1685**

The production in France during the German occupation of a scientific publication of this type is in itself a feat deserving the congratulations of the scientific world. In the specialized field of avian pathology, reliable up-to-date textbooks are always in demand by research workers and others interested in the problems of poultry disease. It is unfortunate that in several important respects, the book under review will fail to satisfy the requirements of those most needing its assistance.

In the first place, the value of a textbook in two volumes and containing nearly 900 pages would be increased by the inclusion of an index; a six-page summary of contents at the end of the second volume is hardly adequate. It is impossible to refer to any of the references quoted in the text as only the date and the name of the author are given. There are no lists of references at the end of the chapters or sections.

The whole work consists of two main sections, the first dealing with diseases under the headings of nutritional disorders, tumour formations including lymphomatosis, infectious diseases, parasitic diseases, and toxicology, and the second concerned with the special pathology and parasitic infections of the digestive system and alimentary tract, the urinary, reproductive and respiratory systems, the blood, the eye and nose, the nervous system and connective tissues. Both volumes are attractively bound and the whole is printed on excellent paper; the 556 figures, most of them photographs, are beautifully reproduced and thoroughly illustrate the subject matter of the text. Brought up to date and with the addition of an index and proper references, these volumes would be a great asset to the library of anyone concerned with the various problems met in connexion with avian disease.—J. D. B.

BRAGA, A. (1940.) Soros, vacinas, alérgénos e imunigenos. Tomo I. **[Sera, vaccines, allergens and immunogens. Volume I.]** pp. 236. 27 tables. Rio de Janeiro. 8vo. [French summary at end of each chapter.] [For vols. II, III & IV, see *V. B.* **12.** 520, **13.** 308, & **16.** 211.] **1686**

In this first of four volumes dealing with immunology, B. deals with titration of anthrax, pasteurella, foot and mouth disease and swine fever antisera, venin antisera, tetanus antitoxin, and mallein. One chapter deals with minor work, such as the labelling and final examination of biological products. The sanitary control of the products under Brazilian legislation is discussed.

The first volume is well illustrated by suitable tables and full references are given.—H. G. ARAMBURU.

LOPEZ Y LOPEZ, C. (1943.) Sueros, vacunas e inoculaciones reveladoras. **[Sera, vaccines, and diagnostic agents.]** pp. 84. Madrid: Ministerio de Agricultura, Sección de Publicaciones, Prensa y Propaganda. 8vo. **1687**

This booklet, intended for the layman, gives a concise non-technical review of methods of immunization and of the use of the diagnostic agents. An omission from the list of diseases dealt with is foot and mouth disease.—H. G. ARAMBURU.

JAEGER, E. C. [Riverside Junior College, Riverside, California.] (1944.) **A source-book of biological names and terms.** pp. xxvi + 256. 96 figs. Springfield, Ill.: Charles C. Thomas. 8vo. $3.50. **1688**

A short section at the beginning of this book explains how words are built up from a stem by the addition of prefixes and suffixes, and in some cases by the combination of stems and roots. Following this are ten pages explaining how specific names, technical terms and generic names have been derived, the greater part of this section dealing with generic names.

The main body of the work consists of a list of some 12,000 word elements from which scientific terms have been built up. In each case the origin of the word element is given, together with examples illustrating its use in the building of scientific words.

The book should help in the correct spelling of words and serve as a useful guide to intelligent pronunciation. To those interested in the derivations of scientific terms it will prove an exceedingly useful and prolific source of information and will aid scientific workers who may wish to coin new words.—T. E. G.

See also absts. **1527** (virus diseases, part II); **1528** (rabies in India), **1575** (joint-ill in foals), **1630** (penicillin).

4694—Wt.P3—Dd228—9/46—H.R.G. Ltd.—G.13.

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